

**FREE! 6GB OF RESOURCES** TO CREATE EXPERT GAME ART!

INSPIRING  
CG ARTISTS

**3D  
WORLD**

3dworld.creativebloq.com  
April 2016  
#206

**MASTER  
UNREAL  
ENGINE**

Learn the **new tools** of  
real-time rendering

**FREE!**

Video training  
**Game-ready textures**  
Maya project files  
**Game props**  
Models

**BECOME A PRO**

**GAMES ARTIST**

Break into the games industry with advice from leading artists  
at **Naughty Dog, Infinity Ward, 343 Industries** and more!



**PLUS!**  
**AUTODESK'S  
STINGRAY**

Get started in the  
latest game tool!

Future



# THE DIGITAL ANIMATION & VISUAL EFFECTS SCHOOL

**DAVE  
SCHOOL**

[www.daveschool.com](http://www.daveschool.com)



**MALUSI TUGWANA**

2015 GRADUATE

"If I've learned anything from The Dave School, it would be the value of hard work, determination and the importance of having a strong passion for doing something you love. At the end of the day, coming to The DAVE School was one of the best decisions I've made in my life and I would implore any other aspiring 3D Artist to do the same."



TO SPEAK WITH ADMISSIONS OR TO SCHEDULE A TOUR, PLEASE **CALL (855)328-3839**  
THE DAVE SCHOOL IS LOCATED ON THE BACK LOT OF **UNIVERSAL STUDIOS FLORIDA®** IN ORLANDO.

THE DAVE SCHOOL IS NOT OPERATED BY NOR AFFILIATED WITH UNIVERSAL ORLANDO®





EDITOR'S

# WELCOME

Start your career here, and break into the game art industry



If you dream of creating characters for Naughty Dog or environments for Infinity Ward, then this issue is for you. On page 42 leading art directors, artists and graduates share their experiences of the games industry... and advice on how you can land your dream job! Plus, on page 36, Epic Games' artists reveal what it takes to create photoreal hair, in real-time, using Unreal Engine 4.11. Training this issue comes from professional artists at Cloud Imperium Games, Guerrilla Games, Ninja Theory and MachineGames, who tackle modelling, rigging, concept design, texture asset creation and more, beginning on page 51. If you want to break into the games industry, this issue is your 'Press Start To Play'.

**Ian Dean, editor**  
ian.dean@futurenet.com

## SUBSCRIBE

Subscribe to 3D World and get both the print and digital editions. Turn to page 50 for the latest offers!



**MODEL AND RIG A GAME-READY CHARACTER**  
Guerrilla Games' artists share their techniques on page 52



**EMAIL**  
3dworld@futurenet.com



**WEBSITE**  
3dworld.creativebloq.com



**FACEBOOK**  
www.facebook.com/3dworldmagazine



**TWITTER**  
@3DWorldMag





ISSUE 206

# CONTENTS

Our complete line-up for this month's 3D World



## DIGITAL SUBSCRIPTIONS

Get the latest magazine for free in our current offer or download a back issue on iPad and iPhone today! [www.bit.ly/3dworld-app](http://www.bit.ly/3dworld-app)

### 6 FREE DOWNLOADS

Get your hands on 6GB of assets via our Vault download system

### 8 ARTIST SHOWCASE

Discover the best new digital art and more from the CG world

### 19 COMMUNITY

#### 20 THE OSCAR PROCESS

Art directors reveal what really goes into winning an Oscar

#### 24 STUDIO PROFILE: ZERO VFX

Behind the scenes at the rising star of the VFX industry

### 30 ARTIST Q&A

All your software queries solved

## FEATURE

#### 36 REAL-TIME HAIR RENDERING

Epic Games on rendering hair for the video game Paragon

#### 42 POWER-UP YOUR CAREER

Leading artists reveal what it takes to break into the games industry

### 51 TUTORIALS

Improve your CG art skills with our professional advice and training

### 87 DEVELOP

Theory, research and reviews

## REGULARS

50 SUBSCRIPTIONS

59 PRO SUBSCRIPTIONS

93 NEXT MONTH

100 DIGITAL BACK ISSUES



### 8 ARTIST SHOWCASE

The best new art from the CG community



### 20 OSCAR SEASON

What really goes into winning an Oscar



### 28 3D PRINT PROJECT

The joy of creating 3D printed bees



### 30 ARTIST Q&A

Your CG art problems solved



### 36 FEATURE: TARGETING REAL-TIME HAIR RENDERING

Epic Games share their process for rendering photoreal hair in Unreal Engine 4.11



### 42 FEATURE: POWER-UP YOUR CAREER

Artists from leading game studios reveal what it takes to land a dream job





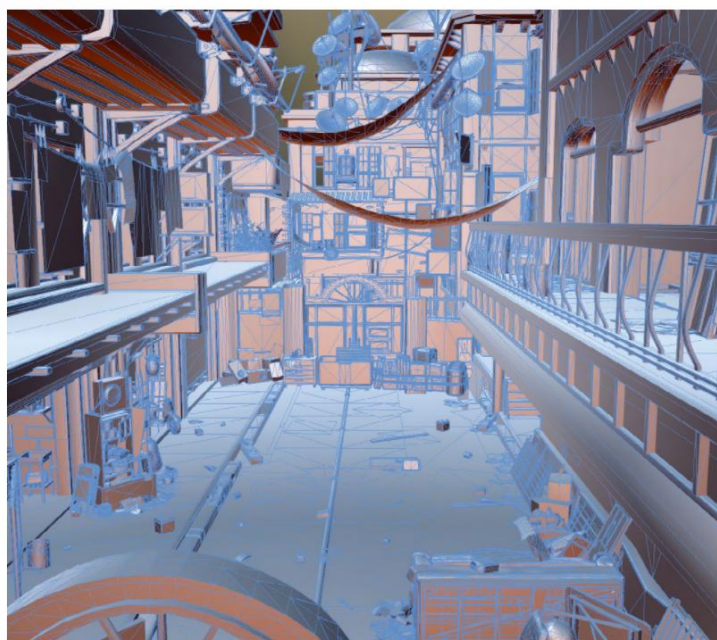
**52 CHARACTER CREATION**  
Model and rig a game-ready character



**72 IMPROVE YOUR SCULPTING**  
Understanding human anatomy



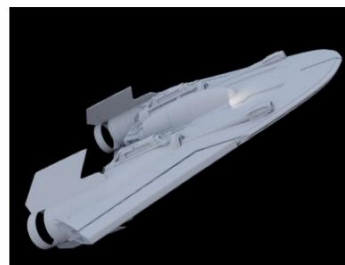
**60 MASTER 3D CONCEPT ART**  
Learn the skills to design and model a concept vehicle for video game production



**80 MODELLING VIDEO GAME PROPS**  
Improve your speed and workflow for modelling environment assets



**88 IS THE CG INDUSTRY CONVERGING?**  
Escape Studio's Simon Fenton explores the convergence of game and film processes



**90 V-RAY FOR NUKE**  
Josh Parks explores the software's lighting



**94 REVIEW: QUIXEL 2**  
Is this a must-have texture suite?

## TUTORIALS

### 52 CHARACTER CREATION

Model and rig a game-ready character for video games

### 60 MASTER 3D CONCEPT ART

Design and model a concept vehicle for video game production

### 66 SIMULATE AN EXPLOSION

How to use Cinema 4D's Projection Man tool to create an explosion

### 68 CREATE A TEXTURE SET

Create and apply multi-purpose tiling textures for environments

### 72 IMPROVE YOUR SCULPTING

Understand the human anatomy in your figure sculpting

### 76 GET STARTED IN STINGRAY

Harness the tools of Autodesk's new game engine

### 80 MODELLING GAME PROPS

Improve your speed and workflow for creating environment assets



## DEVELOP

### 88 IS THE CG INDUSTRY CONVERGING?

Escape Studio's Simon Fenton explores the convergence of game and film processes

### 90 V-RAY FOR NUKE

Setting up lights in the latest compositing software

## REVIEWS

### 94 REVIEW: QUIXEL 2

Is this the must-have texture suite for 2016?

### 96 REVIEW: IRAY

The new physically-based render plug-in from Nvidia is tested

### 100 MY INSPIRATION

The Imaginarium's Rebecca-Louise Leybourne on why she loves her job



6GB OF  
VIDEO &  
FILES



IN THE VAULT

# FREE RESOURCES

Follow the link to download your free files  
[www.creativebloq.com/vault/3dw206](http://www.creativebloq.com/vault/3dw206)

## GET YOUR RESOURCES

You're three steps away from this  
issue's video training and files...

### 1. GO TO THE WEBSITE

Type this into your browser's address bar:  
[www.creativebloq.com/vault/3dw206](http://www.creativebloq.com/vault/3dw206)

### 2. FIND THE FILES YOU WANT

Search the list of free resources to find  
the video and files you want.

### 3. DOWNLOAD WHAT YOU NEED

Click the Download buttons and your  
files will save to your PC or Mac.

## PLUS!

There are more files, art and  
resources waiting online...

**Video** Download the files to get more  
from our V-Ray for Nuke training

**Files** Download the training for this  
issue's Artist Q&A tutorials

**Artwork** Download the extra tutorial  
images to accompany Showcase

**Artwork** Download the files to follow  
our game anatomy tutorial

Complete game  
character course!



### VIDEO+RIGGING FILES MODEL AND RIG A GAME CHARACTER

Download video walkthroughs and rigging files to create a game-ready model



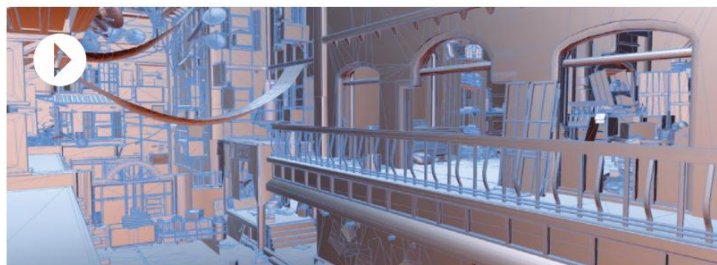
### VIDEO+TEXTURES SCENERY

Follow the video and download the textures



### PROJECT FILES STINGRAY

Download the project files to try Stingray



### VIDEO+SCENE FILES+TEXTURES GAME ENVIRONMENT

Get the video walkthrough, 3ds Max work files and textures to create this environment



### STEP FILES CONCEPT DESIGN

Download the step-by-step screens





## CONTACT US

### 3D WORLD MAGAZINE

#### FUTURE PUBLISHING

Quay House, The Ambury,  
Bath, BA1 1UA

telephone: +44 (0) 1225 442244

email: enquiries@3dworldmag.com

website: 3dworld.creativebloq.com

facebook: www.facebook.com/3dworldmagazine

twitter: @3DWorldMag

### EDITORIAL

EDITOR *Ian Dean*

ART EDITOR *Darren Phillips*

PRODUCTION EDITOR *Felicity Barr*

COMMISSIONING EDITOR *Julia Sagar*

DEPUTY COMMISSIONING EDITOR *Sammy Maine*

STAFF WRITERS *Alice Pattillo, Dominic Carter*

### CONTRIBUTORS

*Gurmukh Bhasin, Matthew Doyle, Matthias*

*Develtere, Ben Erdt, Simon Fenton, Mike Griggs,*

*Paul Hatton, Matthew Trevelyan, Johns, Fady*

*Kadry, Brian Karis, Greg Kulz, , Gaëtan Lassagne,*

*Perry Leijten, Rebecca-Louise Leybourne, Jeen Lih*

*Lun, Francis-Xavier Martins, Kulsoom Middleton,*

*Josh Parks, Jordan Walker, Alvin Weetman*

### MANAGEMENT

MANAGING DIRECTOR MAGAZINES DIVISION *Joe McEvoy*

EDITORIAL DIRECTOR *Matthew Pierce*

GROUP ART DIRECTOR *Rodney Dive*

### ADVERTISING

ADVERTISING MANAGER *Sasha McGregor*

(0)1225 687675 sasha.mcgregor@futurenet.com

ACCOUNT DIRECTOR *George Lucas*

(0)1225 687311 george.lucas@futurenet.com

SALES EXECUTIVE *Chris Mitchell*

(0)1225 687832 chris.mitchell@futurenet.com

### PRODUCTION & DISTRIBUTION

PRODUCTION CONTROLLER *Nola Cokely*

PRODUCTION MANAGER *Mark Constance*

PRINTED IN THE UK BY: William Gibbons & Sons Ltd

on behalf of Future.

DISTRIBUTED BY: Seymour Distribution Ltd, 2 East Poultry

Avenue, London EC1A 9PT, Tel: 0207 429 4000

OVERSEAS DISTRIBUTION BY:

Seymour International

### CIRCULATION

TRADE MARKETING MANAGER *Juliette Winyard*

07551 150 984 juliette.winyard@futurenet.com

### LICENSING

SENIOR LICENSING & SYNDICATION MANAGER

*Matt Ellis* matt.ellis@futurenet.com

+ 44 (0)1225 442244 Fax +44 (0)1225 732275

### SUBSCRIPTIONS

UK READER ORDER LINE & ENQUIRIES:

0844 848 2852

OVERSEAS READER ORDER LINE & ENQUIRIES:

+44 (0)1604 251045

ONLINE ENQUIRIES: www.myfavouritemagazines.co.uk

EMAIL: 3dworld@myfavouritemagazines.co.uk

**Want to work for Future?**  
Visit [www.yourfuturejob.com](http://www.yourfuturejob.com)

**Future**

Future is an award-winning international media group and leading digital business. We reach more than 49 million international consumers a month and create world-class content and advertising solutions for passionate consumers online, on tablet & smartphone and in print.

Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR).  
[www.futureplc.com](http://www.futureplc.com)

Chief executive *Zillah Byng-Thorne*  
Non-executive chairman *Peter Allen*  
Chief financial officer *Richard Haley*

Tel +44 (0)207 042 4000 (London)  
Tel +44 (0)1225 442 244 (Bath)

All contents copyright © 2015 Future Publishing Limited or published under licence. All rights reserved. No part of this magazine may be reproduced, stored, transmitted or used in any way without the prior written permission of the publisher. Future Publishing Limited (company number 2008885) is registered in England and Wales. Registered office: Registered office: Quay House, The Ambury, Bath, BA1 1UA. All information contained in this publication is for information only and is, as far as we are aware, correct at the time of going to press. Future cannot accept any responsibility for errors or inaccuracies in such information. You are advised to contact manufacturers and retailers directly with regard to the price and other details of products or services referred to in this publication. Apps and websites mentioned in this publication are not under our control. We are not responsible for their contents or any changes or updates to them. If you submit unsolicited material to us, you automatically grant Future a licence to publish your submission in whole or in part in all editions of the magazine, including licensed editions worldwide and in any physical or digital format throughout the world. Any material you submit is sent at your risk and, although every care is taken, neither Future nor its employees, agents or subcontractors shall be liable for loss or damage.

## METTLE SKYBOX STUDIO



## 360/VR Production Tools for After Effects

- Generate 360/VR from your comp
- Import stitched 360 footage, or Equirectangular 3D animation, and add graphics, text and VFX.

"SkyBox Studio is a necessity for cinematic 360/VR production in After Effects. Especially if you're working with 360 degree footage."

**Mikey Borup** *After Effects With Mikey*

**Try SkyBox Studio now**  
[mettle.com/product/skybox-studio](http://mettle.com/product/skybox-studio)

**METTLE**





ARTIST

# SHOWCASE

The best digital art from  
the CG community

## MOSASAURUS ATTACK



ARTIST

Anders Rådén

SOFTWARE V-Ray, Photoshop,  
After Effects

"I'm inspired by the animal world at large," says Swedish freelance illustrator and animator Anders Rådén, whose interest in creatures and history has led to him working with the Natural History Museum and Helsinki Zoo. "I get lots of ideas for 3D art by watching the programmes of my idol, David Attenborough," he adds. Using references from modern documentaries also helped Anders to create a realistic prehistoric predator swimming through modern waters. "I wanted to create a variation of the classic Jurassic World poster, with the Mosasaurus scaring the living daylights out of a great white shark," he explains. "Which was a bit of a challenge since sharks aren't very expressive!"

Created in just a week, Mosasaurus Attack posed a fun challenge for Anders. "I liked cracking the code for simulating a persuasive underwater scene," he says. Light dispersion in particular was essential for the success of the illusion: "In the end, caustic reflections were generated by shining a light through a water surface plane with a fractal noise bump map."

To finish off the piece, Anders added plates with bubbles photographed against a black background. "Air bubble size is very important for a correct sense of scale," he reveals. "They add a great sense of motion to both hunter and prey."

FYI

See more of Anders' concept art, illustration and animation work by visiting [www.ardi.se](http://www.ardi.se)



GET PUBLISHED

EMAIL YOUR CG ART TO  
[ian.dean@futurenet.com](mailto:ian.dean@futurenet.com)



Visit the online Vault to download  
extra process art for these projects:  
[www.3dworldmag.com/vault/3dw206](http://www.3dworldmag.com/vault/3dw206)





Air bubbles add a great sense of motion  
to both hunter and prey, and bubble  
size is important for a sense of scale



#### 3D WORLD VIEW

"This underwater scene is incredible. The depth of scale in the water has paid off, allowing Anders to create a highly realistic historic predator."

IAN DEAN  
Editor





## MEAL ON BOARD!



**ARTIST**  
Jose Rodriguez  
**SOFTWARE** 3ds Max, ZBrush,  
Photoshop

Seeing as he works by day as a character artist at Ilion Animation Studios, it's no surprise that Jose Rodriguez's witty Meal on Board is a stylish piece populated with distinctive characters. Having worked in the world of 3D for 12 years, covering both video games and animations for movies, the Spanish artist has honed his character modelling talents.

Unsurprisingly, Jose draws on the work of other studios for creative cues. "I'm influenced by lots of things – images, songs, and the work of my mates," he says. "But I'm especially inspired when I see a new cinematic piece from big companies like Blur Studio and Blizzard. They're awesome!"

Jose found this project, whipped up in creative bursts over two-and-a-half months, relatively straightforward. "I might have tried to do something different with the water, but I finally decided to keep the whole process simple," he explains. "The characters don't need too many details, so it was easy to do without adding anything special."

After collecting reference images to inform his character design, Jose started sculpting. "To me the most enjoyable parts are always modelling and creating the final composition," he adds. "So in this image everything was super fun because basically that was the entire process."

**FYI** See more of Jose's art, including character design sketches, by visiting [www.jrs3d.com](http://www.jrs3d.com)



### 3D WORLD VIEW

"Jose's fun and witty Meal on Board is definitely my favourite this issue. His character modelling is terrific – relatively simple but hugely effective. Great job!"

**DARREN PHILLIPS**  
Art editor



To me the most enjoyable parts  
are always modelling and  
creating the final composition

### CREATING CHARACTERS

Paradoxically for a character designer, Jose says he most enjoys sculpting high-res details and the compositing that brings an image to life



## Designing with reality: Cinema 4D Release 17

### Faster. Easier. More Realistic.

Cinema 4D Release 17 makes the easiest-to-use professional 3D software more efficient than ever before. New tools as well as expanded and completely reworked features help you turn your ideas into reality even quicker and with less effort. The improved workflow helps you meet the tightest deadlines. We've even gone so far as to re-invent the line!

Visit us at IBC 2015, booth 7.K30, and experience Cinema 4D R17 live or follow our livestream on [www.maxon.net](http://www.maxon.net)

[www.maxon.net](http://www.maxon.net)



# CINEMA 4D

Release 17







I like to track the inspirations  
of other artists and roll  
back through time



#### 3D WORLD VIEW

"I really like Pascal's unusual take on this classic character. You can definitely tell he has an eclectic mix of influences."

IAN DEAN  
Editor

## JACK THE GIANT HUNTER



#### ARTIST

Pascal Blanché

SOFTWARE 3ds Max, ZBrush,  
V-Ray, Photoshop

Over the years, French artist Pascal Blanché has touched on every aspect of 3D, from animation to printing. He started his freelance career in 1993, working on computer game magazines before moving into the video game industry itself. Currently art director at Ubisoft Montreal as well as a freelancer, he finds time for personal projects such as his desolate Jack the Giant Hunter, completed in just six hours.

Pascal used a cloth simulation in 3ds Max for the main figure. "The most enjoyable part," he says, "is when I find the correct balance in the composition and all the elements come together during the rendering. I look forward to the moment when I work out touch-ups in Photoshop, getting close to the final picture and liking what I've come up with."

"I'm inspired by everything," Pascal reveals. "A book, a soundtrack, a movie, but most of all I like to track the inspirations of other artists and roll back through time to unknown influences. It's like a treasure hunt."

**FYI** Pascal offers Photoshop files on Patreon, or see more at [www.3dluvr.com/pascalb](http://www.3dluvr.com/pascalb)



9.3





# NEW FUSION 8

The world's most advanced visual effects and motion graphics software!

For over 25 years Fusion has been used to create visual effects on thousands of blockbuster films, TV shows and commercials. Fusion features an easy to use and powerful node based interface, a massive tool set, true 3D workspace and GPU accelerated performance all in a single application! Now with Fusion 8 you can use the same powerful software to create your own blockbuster effects!

## Hollywood's Secret Weapon

Fusion has been used to create groundbreaking visual effects and motion graphics for Hollywood films such as The Martian, Thor and The Hunger Games, as well as on hit television shows like Orphan Black, Breaking Bad, Grimm and Battlestar Galactica! If you've ever gone to the movies or watched television, then you've seen Fusion in action!

## Work Faster with Nodes

Fusion uses nodes to represent effects and filters that can be connected together to easily build up larger and more sophisticated visual effects! Nodes are organized like a flow chart so you can easily visualize complex scenes. Clicking on a node lets you quickly make adjustments, without having to hunt through layers on a timeline!

## Incredible Creative Tools

Whether you need to pull a key, track objects, retouch images, animate titles, or create amazing 3D particle effects, Fusion has the creative tools you need! You get a true 3D workspace, the ability to import 3D models and scenes from software like Maya and 3ds Max, along with hundreds of tools for compositing, paint, animation and more!

## Scaleable Studio Power

Fusion's GPU acceleration gives instant feedback while you work, so you spend more time being creative and less time waiting! Fusion 8 Studio also includes optical flow and stereoscopic 3D tools, along with unlimited free network rendering and tools to manage multi user workflows, track assets, assign tasks, review and approve shots, and more!

**FUSION 8** ..... **Free Download**

For Mac OS X and Windows

**FUSION 8 STUDIO** ..... **£705\***

For Mac OS X and Windows

[www.blackmagicdesign.com/uk](http://www.blackmagicdesign.com/uk)

\*SRP is Exclusive of VAT.





My biggest inspiration is when  
I manage to give shapes and  
images to my thoughts



# GANESHA



## ARTIST

Hanzi Gabor

**SOFTWARE** ZBrush, 3ds Max, V-Ray, Mari, Photoshop

"I started to get interested in 3D art seven years ago, and it was love at first sight," explains Budapest-based artist Hanzi Gabor. "I really started to admire the world of 3D and it immediately became my hobby," he says. This hobby quickly turned into a job, as Hanzi soon started to work on 3D art for a company specialising in educational material. Now Hanzi works as a 3D generalist for one of his favourite animation studios, DigiC Pictures.

From the jewellery to the grapes, as well as the evocative textures on the lustrous clothes and elephant head, Hanzi's Ganesha is packed with stunning details. It was created in roughly four weeks, and Hanzi's talent and enthusiasm are clear to see. "The sculpting of Ganesha was the most enjoyable part," he says. "It was good to see how the image came alive."

Watching the artwork come together after it was sculpted in ZBrush and painted with textures in Mari was exciting for Hanzi. "My biggest inspiration is when I manage to give shapes and images to my thoughts, and I get to see what I am thinking of," he says. "It's a very amazing experience when your work is recognised."

**FYI**

To see more of Hanzi's work, visit [www.hanzigabor.daportfolio.com](http://www.hanzigabor.daportfolio.com)



## TOP TEXTURING

Hanzi loves competitions and came second in an international texture painting challenge



## 3D WORLD VIEW

"I absolutely love the intricate detailing in Hanzi's Ganesha and his use of ZBrush for the sculpting is superb."

**FELICITY BARR**  
Production editor





# BULMA'S SUIT MK-01



**ARTIST** Genc Buxheli  
**SOFTWARE** ZBrush, ZModeler,  
Marvelous Designer, Substance  
Painter, Photoshop, Marmoset

With an extensive background as a 3D freelancer, Albanian artist Genc Buxheli's passions include character design and animation. Both of these interests come together in Bulma's Suit MK-01, which blends together characters and designs from the worlds of Dragon Ball and Marvel's Iron Man. Created for a contest where the theme was to merge two comic characters, this piece took roughly four weeks to complete from concept to rendering.

Seeing the strong concept and confident realisation, it's hard to believe that this is Genc's first anime character. But he's happy with the result. "It turned out exactly as I imagined," he says. "I felt very comfortable working on a style that's not photorealistic. It helped me to be less preoccupied when modelling and to have more fun with proportions, colours and details."

Striking a balance between the styles found in Dragon Ball and Iron Man was a challenge for Genc. "Since this piece is in an anime style, I didn't want to overdo the detailing, so I kept it very subtle," he explains. To make it look as if the armour came from the Dragon Ball universe, Genc took his cues from the series' artist Akira Toriyama. "He uses very distinct round shapes when designing machinery for vehicles and androids," says Genc, and this is an influence which can clearly be seen in Bulma's soft, curved plating.

**FYI** See more of Genc's work by visiting  
[www.artstation.com/artist/gbuxheli](http://www.artstation.com/artist/gbuxheli)



I liked the idea of the fabric  
being deformed by the armour  
from underneath

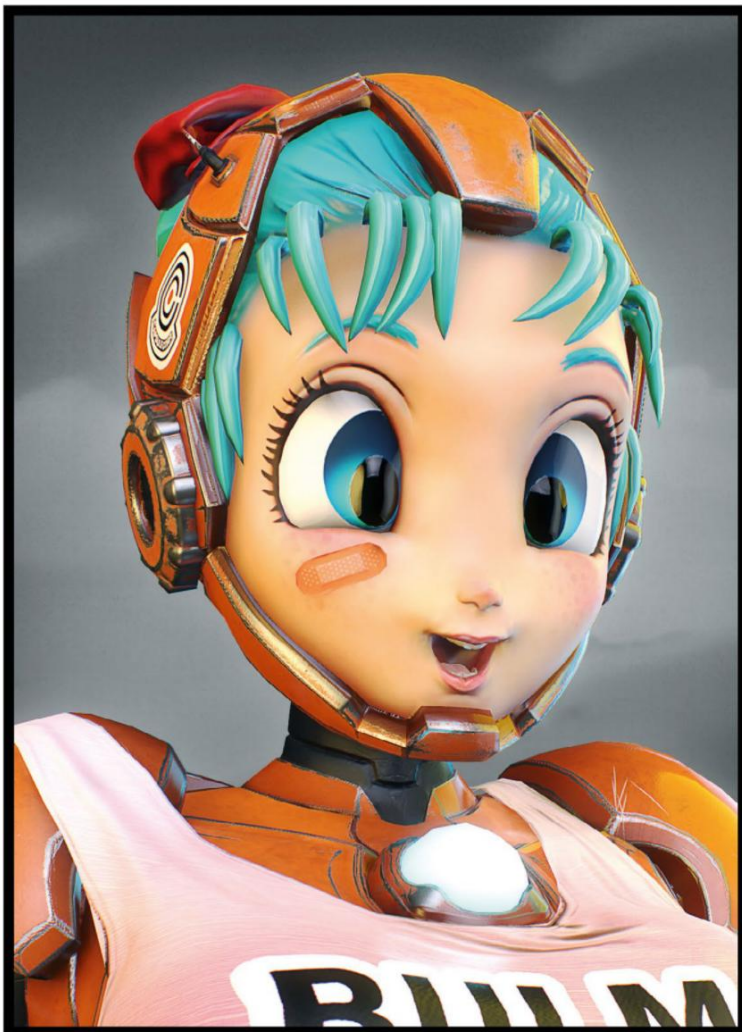


## 3D WORLD VIEW

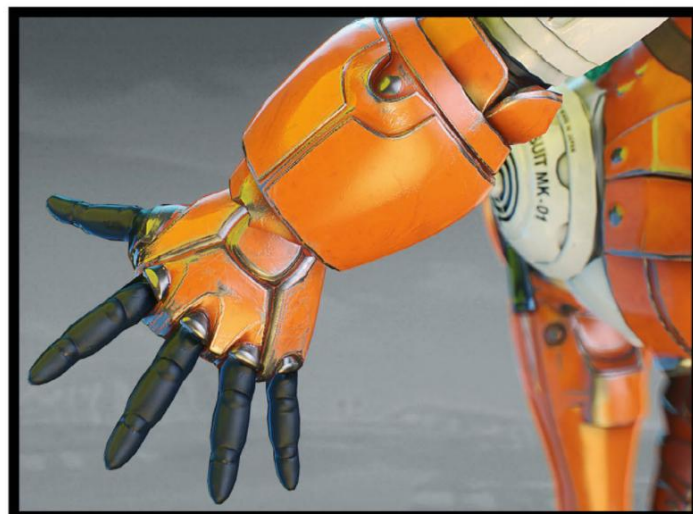
"Genc's first anime character is really rather impressive. It's clear to see where he took inspiration from."

**FELICITY BARR**  
Production editor





**BASE BUILDING**  
The fun part! I start off in ZBrush from a sphere, activate DynaMesh, then move stuff around until I get the basic shape of the body. I keep my concept in the background to get proportions correct



#### REFERENCE HUNTING

First things first, I gather as many reference pics as possible. Then I start sketching. For this character I already had a general idea of how it should look, since Bulma is a well-known character from Dragon Ball and we all know Iron Man's armour





**PolyTrans**  
and NuGraf

An Industry Standard for 3D Data Translation.  
Supports all Major CAD & Animation Programs

Download  
Demos & 8 Page  
PDF Brochure from  
[www.okino.com](http://www.okino.com)

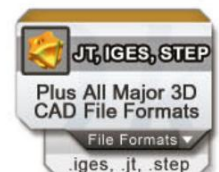
Okino's PolyTrans|CAD+DCC® Translation System is used by the world's major aerospace, automotive, engineering, military, corporate & 3D production companies for the most extensive and accurate cross conversion of MCAD, CAD, VisSim & DCC/Animation 3D data assets.

**Supports the Most Cost Effective & Rock Stable Selection of 22 Major CAD File Formats & Native CAD Packages -- Our Primary Specialty!**  
**Provides the Most Robust MCAD, Full Scene & Animation Conversions for 3ds Max, Cinema-4D, LightWave, Maya, Softimage, Collada, FBX & More.**

Packed with Great Functionality + Top-Notch Okino Support



Kemppi Welding Machines visualized in Newtek LightWave. © 2016 by Keith Mann (Spikey Animation, U.K) and Kemppi Oy.  
STEP and Parasolid MCAD models converted & optimized for LightWave via Okino's PolyTrans|CAD conversion software.



### Common Solutions & Benefits:

- Solid, robust solution used around the world by tens of thousands of 3D professionals and well known companies
- Import and compose 3D scenes from a plethora of 2D/3D file formats then render out to high quality images for print media, training manuals, or marketing brochures
- Popular for downstream repurposing of Pro/E/Creo, CATIA, JT, SolidWorks, Inventor, IGES, STEP, etc. to D.C.C. programs
- Highly refined & popular 3ds Max <-> Maya pipeline via native plug-ins, with over 20 years of development & production use
- Robust import, optimization, viewing & conversion of huge MCAD, CAD, D.C.C, animation, VisSim and AEC models
- 3 decades of development. Personal, educated & dedicated hands-on support directly from the Okino developers
- Converts entire scenes, including meshes, NURBS, hierarchy, animation, pivot points, vertex normals/colors/uv's, textures, lights, cameras, mesh skinning (deformations) & meta data

### Major Features:

- Converts & optimizes all major CAD formats to 3ds Max, Maya, Softimage, C4D, LW and dozens more file formats & 3D programs
- Handles the world's most massive of massive 3D conversions into lesser downstream programs & apps that other 3D software cannot process - our core specialty & focus (oil & gas rigs, etc.)
- Recent converters: SolidWorks 2016, Pro/E/Creo 3, Cinema-4D, Inventor 2016, CATIA v4+v5, Collada, DGN v7+v8, DWF-3D (for AutoCAD, Navisworks & Revit), DXF/DWG 2015, ESRI, FBX, JT Open v7, Max/Maya/Softimage 2016, OpenFlight 16.x, OSG Export, PLY, PDB, Rhino v5, SAT v25, SketchUp, XGL, XAML, U3D & more. Extensively developed & well supported.
- All Granite CAD converters for US\$395 (Pro/E/Creo, IGES solids, STEP solids, Parasolid, SAT). Crack-free BREP solids converters
- Top notch animation, skinned mesh & skeleton conversion
- Integrated multi-media image editor, viewer & converter
- 'Document-centric' architecture, extensive user interface 'system' plug-in API and 3D import/export API
- A wonderful addition to Google Earth and Trimble SketchUp: adds dozens of new, industry standard 3D file formats and provides architectural rendering

- Ideal AutoCAD, Revit, Navisworks & Inventor 3D conversions via DWF (ie. re-export to KeyShot)
- New "PolyTrans-for-Cinema-4D". The first native .c4d imp/exp conversion system in 18 years. Performs technically correct and error free conversions from all major CAD file formats, and animation/DCC cross conversions.
- "PolyTrans-for-3dsmax" & "PolyTrans-for-Maya" native plug-in versions of Okino software
- Animation conversion amongst 3ds Max, Maya, C4D, LightWave, Softimage, Collada, FBX, U3D, DirectX, XAML-3D & more = an industry standard
- Mesh & scene processing toolset, including excellent built-in polygon reduction system
- Photo-real ray traced rendering, material editing & texture parameter editing in Okino NuGraf



Excellent support for  
third party developers!

**Okino Computer Graphics, Inc.**

Tel: (Toll Free) 1-888-3D-OKINO. (1-905) 672-9328

WEB: <http://www.okino.com>. Email: [sales@okino.com](mailto:sales@okino.com)

All products mentioned are registered trade names of their respective holders.

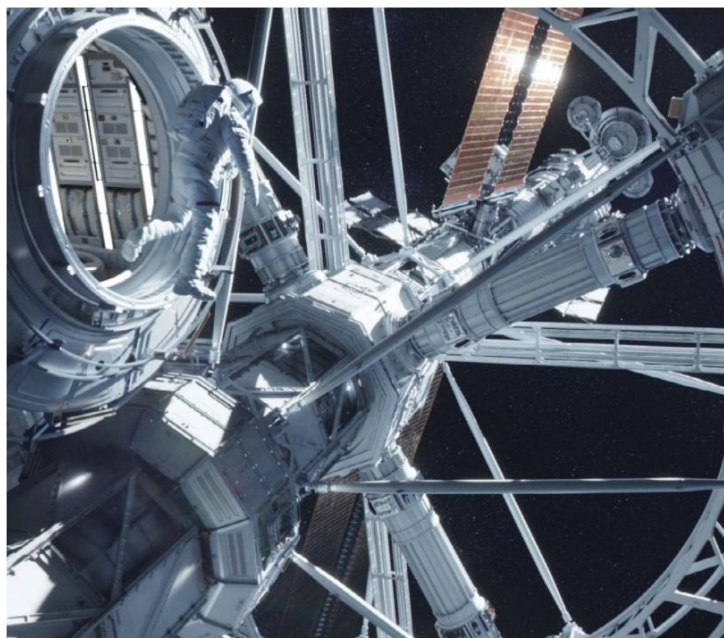




CONTENTS

# COMMUNITY

News and views from around the international CG community



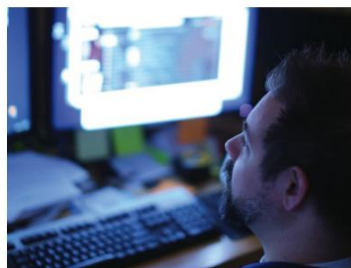
## 20 WHAT GOES INTO WINNING A VFX OSCAR?

The secrets of the bake-off revealed! Discover what it takes to win the award



## 22 CREATIVE MARKET

Download Pete Sekula's 3D cloud pack



## 24 STUDIO PROFILE: ZERO VFX

Behind the scenes at the rising star of VFX



## 26 THE LIGHTING TECH BEHIND FINAL FANTASY REMAKE

Discover why Enlighten is fast becoming the games industry's key technology



## 28 3D PRINT PROJECT

James Abell reveals his perfect 3D prints



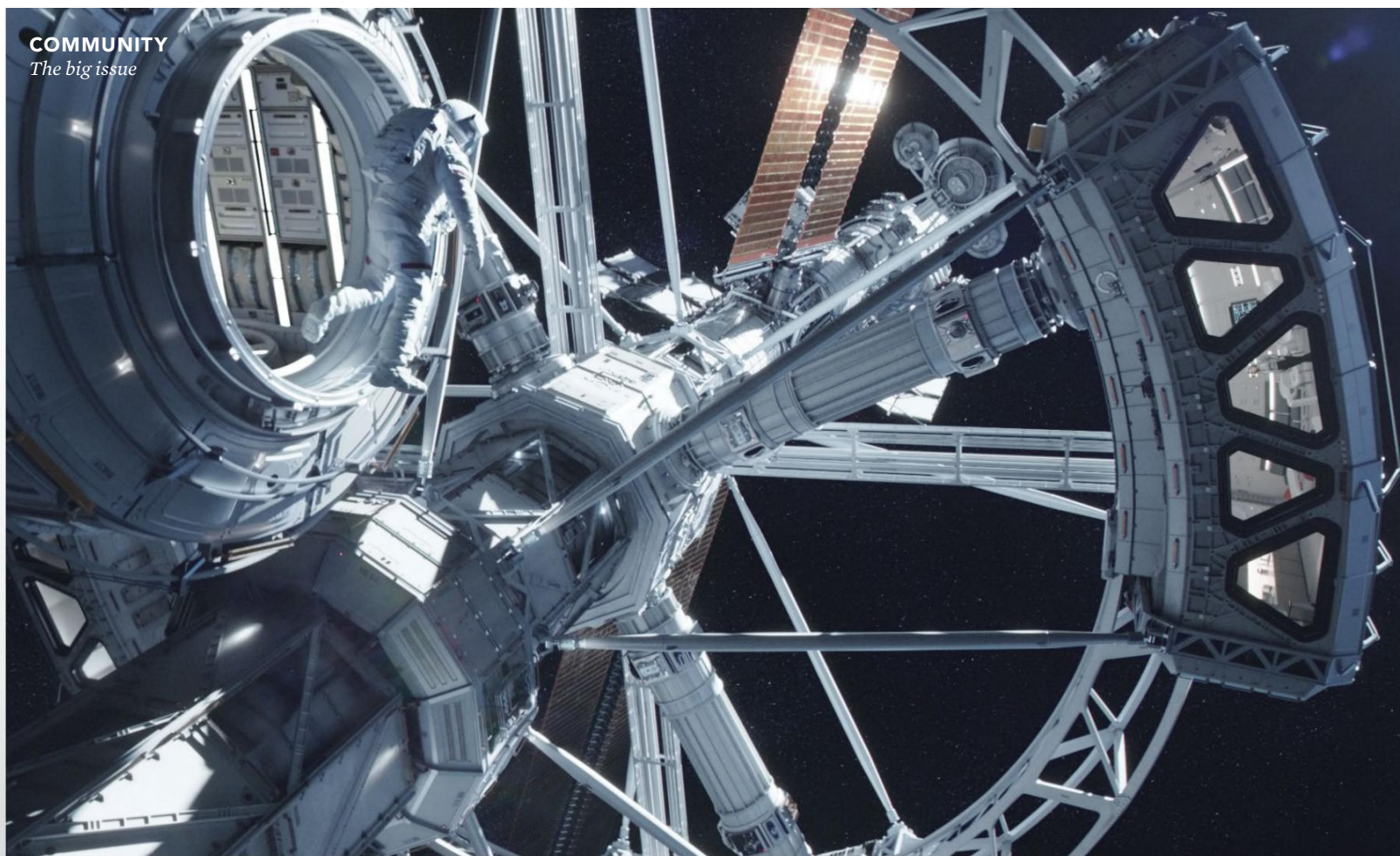
GET PUBLISHED

EMAIL YOUR CG ART TO  
[ian.dean@futurenet.com](mailto:ian.dean@futurenet.com)



Visit the online Vault to download  
extra process art for these projects:  
[www.creativebloq.com/vault/3dw206](http://www.creativebloq.com/vault/3dw206)





# WHAT GOES INTO WINNING A VFX OSCAR?

It's Academy Awards time, but does the VFX Oscar accurately represent the industry? **Jim McCauley** asks the experts

Both MPC and Framestore were nominated for an Oscar for their work on *The Martian*, pictured above

**T**he Academy Awards are the high point of the year for the film industry. Beyond the headline awards there's a raft of recognition for the essential supporting elements of filmmaking, and for the VFX industry there's only one award that matters: Best Visual Effects.

But as our panel of industry experts explain, the process of how the Academy come up with their final five nominees is a story in itself. However, does this process take the focus away from the VFX work itself? And is a single Oscar enough to reflect the contribution made by the industry?

The process begins in December, as Greg Butler from MPC Vancouver



explains: "The Academy's Visual Effects Branch Executive Committee meets to select 20 films that they feel meet the criteria for nomination. Every film that meets the Academy's general rules for consideration is listed, regardless of how much VFX work it contains, how much press it has received or how much money it has

made. Occasionally films on the list are still a few weeks away from release. A few weeks later, the committee meets again to reduce the list down to 10 films that are invited to the bake-offs."

The bake-offs are where things really get interesting: a three-hour event in which the 10 shortlisted nominees show a 10-minute reel, give a presentation on their work and then take questions from Academy members.

It's no small undertaking for potential nominees. "I've done five bake-off



presentations – three as the team leader," says Double Negative's Paul Franklin, who took home the VFX Oscar last year for *Interstellar*. "It's a lot of work and you only have a couple of weeks to pull it together. The *Interstellar* presentation needed several editorial and film-handling teams to be coordinated across two continents, and required the sacrifice of a \$50,000 70mm exhibition print."

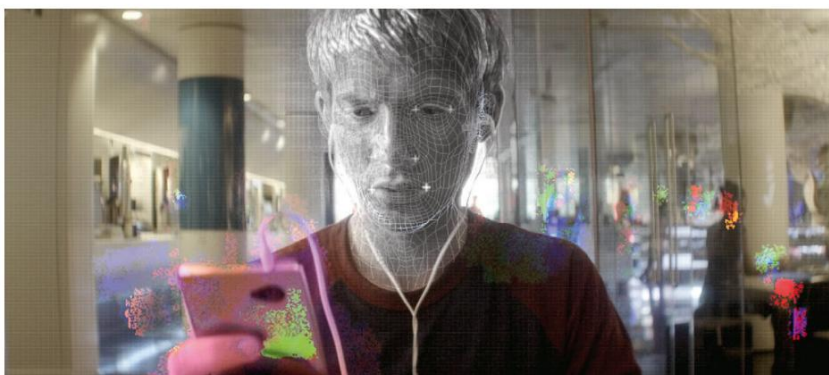
"We only had about three weeks from when nominations are announced to bake-off night," says Greg of his last

bake-off appearance, for *Harry Potter and the Deathly Hallows: Part 2* in 2012. "I wrote a brief summary of the work I supervised on the film. I described some of the creative and technical challenges we faced and mentioned the wide variety of effects we supplied. Tim [Burke, the overall VFX supervisor] incorporated much of what I and the other nominees wrote into his speech before the reel."

With the presentations done, the Academy members vote on the five final nominees. It all comes down to innovation, technical excellence and work that speaks to the story of the film, says Paul. "It's no longer enough to just turn up with a reel full of whizz-bang CG – everyone has that nowadays! The members also respect physical practical work – miniatures, physical effects and so on – as there are lots of physical effects guys in the chapter," he continues. "If you make great claims that you've 'done it for real' and then can't support that on the night, they'll see through you!" With all the preparation that goes into



Best Visual Effects  
Oscar nominees in  
2016 included ILM  
for Star Wars (inset)  
and Milk VFX for  
Ex Machina (below)



the bake-offs, does this mean they take the focus away from what really matters: the VFX work? Chris Lawrence from Framestore, nominated this year for *The Martian*, doesn't believe so:



"I don't think the quality of the presentation itself has so much to do with determining the outcome," he explains.

"I'd say over 90 per cent of the judgement is in the quality of the imagery, but as a lot of VFX is invisible, you have to be told what to look for!"

As an Academy member, Greg can appreciate the process from both sides. "I go to the bake-offs with a pretty clear idea of how I'm going to

It's no longer enough to just  
turn up with a reel full of  
whizz-bang CG – everyone  
has that nowadays!

vote," he explains. "The presentations will occasionally sway me one way or another for films I was unsure about, but rarely change my vote in a big way. Over the years I've seen a few presentations that completely changed my impression of a film's VFX. I think it's a very valuable part of the process; it gives me a great overview of where the industry is each year and informs my voting for the next year."

At the time of writing, the VES Award winners have been announced

with 23 categories being recognised, covering everything from visual effects to modelling, compositing, animation and environments. So is a single Oscar far too catch-all to reflect the broad contribution made by the VFX industry?



Sara Bennett, VFX supervisor at Milk and nominated this year for *Ex Machina*, thinks so. "This is especially true as the number of VFX shots per feature film increases and the way in which VFX is used becomes more sophisticated. It would be ideal to have both Best VFX and Best Supporting VFX categories, to represent the invisible effects which support storytelling and the big groundbreaking effects-driven work."

Paul sees things differently however: "The final voting might be open to question, but the nominated films reflect the judgement of your peers in the business – pretty much every winner in the last 20 years has reflected a significant advance in the art of filmmaking."

What our experts can agree on, though, is the impact that winning the VFX Oscar can have on a studio, the film and its reputation.



"It's the biggest award on the planet for the film industry," says Milk CEO, Will Cohen. "A VFX Oscar is the ultimate accolade for a studio, bringing a great sense of pride for everyone involved in the film and really putting a studio on the map."

**FYI** Get all the Oscars info you need at [www.oscars.org/oscars](http://www.oscars.org/oscars)



## INDUSTRY INSIDERS

*Thoughts & opinions from the experts*



**CHRIS LAWRENCE**  
VFX supervisor,  
Framestore  
[www.framestore.com](http://www.framestore.com)

"I think it's great that the VFX Oscar can go to such a diverse range of crafts within the VFX industry. Last year we had the digital makeup work done on Peggy Carter for *Captain America* up against an accurately simulated black hole for *Interstellar* and a raccoon with a bad attitude for *Guardians of the Galaxy*. It was all incredible work and each movie posed very different challenges. I think that the VFX Oscar is a wonderful way of celebrating that diversity and its catch-all nature should be embraced!"



**PAUL FRANKLIN**  
VFX supervisor and  
co-founder, Double  
Negative  
[www.dneg.com](http://www.dneg.com)

"In the case of two closely-matched films the [bake-off] presentation can make the difference, drawing attention to work that might have otherwise been missed and so on. All that being said, there are clearly some movies that are going through whatever happens on the night; *Avatar*, for example. Crafting a successful VFX Oscar campaign is a real art and a good presentation at the bake-off can make the difference between a nomination or being an also-ran. That being said, it's a real vindication of your work just to get to the bake-off!"



**GREG BUTLER**  
VFX supervisor and  
head of VFX, MPC  
Vancouver  
[www.moving-picture.com](http://www.moving-picture.com)

"A bake-off presentation needs to entertain, inform and engage. The reel should convey the experience of the film and give context to the work being presented. Most of the footage should be VFX shots, but it really helps to have a few small bits of dialogue or non-VFX work. Make sure to highlight all of your strongest work, but avoid being repetitive. If there is significant practical FX work in the film, make sure to feature that. Rehearse your speech, but not so much that it becomes dry or overly polished. Include interesting anecdotes; every project has them and people will want to relate to your experience."



EXTRA  
ENVIRONMENTS

*There's more where  
that came from...*

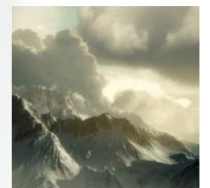
**POLYWORLD:  
ANCIENT EAST**

A collection of architecture, foliage, clouds, and other props designed in the popular low-poly faceted art style. It's excellent for graphic design and games. Get it at: [www.bit.ly/206-ancient](http://www.bit.ly/206-ancient)



**ALPINE TERRAIN  
PACK**

Six high-detailed snowy terrains that can greatly enhance film or game backgrounds. Includes high-res 16bit RAW files for use as displacement maps in your 3D app of choice. Download here: [www.bit.ly/206-alpine](http://www.bit.ly/206-alpine)



**POLYWORLD:  
WOODLAND**

Architecture, foliage, clouds, and other props designed in the popular low-poly faceted art style. This pack contains artwork reminiscent of a hillside village. Download it at: [www.bit.ly/206-wood](http://www.bit.ly/206-wood)



Creative  
MARKET  
**FREE!**  
DOWNLOAD  
NOW!



# HEAVEN'S ABOVE

We're partnering with Creative Market to offer a series of free downloads, continuing with Quantum Theory's 3D Cloud Models

**W**hen you're creating amazing new 3D worlds, you need a sky. And we've fallen in love with this 3D Clouds pack, the work of Quantum Theory, aka Pete Sekula.

A 12 year veteran of the Triple-A console game industry, Quantum Theory's work can be seen on Creative Market, where he's committed to providing the best quality and best optimised artwork for your projects.

A platform for digital design content from independent creatives around the world, Creative Market recently launched a 3D art section. It's a great place to sell your content, says Pete.

"I was approached to set up a marketplace there months ago," he reveals. "Given Autodesk's name recognition and their entry into the game engine space, I thought it would be a good strategic move."

He called his company Quantum Theory, he says, because "small ideas, no matter how unorthodox, can bring great change to your future. Coming from the AAA game industry and adhering to rigid design principles, I felt this name summed up my views."

Pete uses a wide range of software to create his models. "I like to learn as many tools as I can," he explains, "because not everything is best at, well, everything."

Pete primarily uses 3ds Max for modelling, but also uses ZBrush and World Machine for procedural terrain generation. "I had used Photoshop extensively for texturing, but with the advent of physically-based shading, Photoshop is no longer up to the task," he adds. "Allegorithmic's line of software, such as Substance Painter and Substance Designer, fill

For game development, I primarily use  
Unity but look forward to more  
dedicated time with Unreal

that role now. For game development, I primarily use Unity but look forward to more dedicated time with Unreal."

Once again we've partnered with CreativeMarket.com to make Pete's 3D Cloud Models pack available for readers to download – free for personal use! All you need to do is visit our online Vault at [www.creativebloq.com/vault/3dw206](http://www.creativebloq.com/vault/3dw206) and download.

This pack is free for personal use only: to purchase for commercial use, visit [www.bit.ly/206-cloud](http://www.bit.ly/206-cloud).

**FYI** To see more of Pete's work visit  
[www.creativemarket.com/QTheory](http://www.creativemarket.com/QTheory)

**PETE SEKULA**

AAA games industry veteran Pete, aka Quantum Theory, is committed to the best quality and best optimised art work for your projects.  
[www.creativemarket.com/QTheory](http://www.creativemarket.com/QTheory)





IMAGE COURTESY OF EKATERINA PUSHKAROVA



**ZBRUSH 4R7<sup>®</sup>**

Pixologic

PIXOLOGIC.COM



THE ALL-IN-ONE DIGITAL SCULPTING SOLUTION.  
**DESIGNED FOR THE PURSUIT OF ART.**  
SCULPTED, TEXTURED AND RENDERED IN ZBRUSH

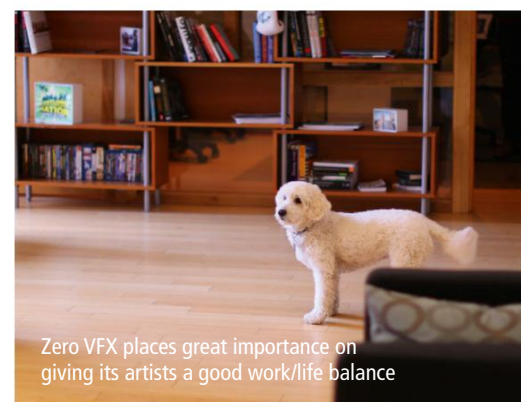




## STUDIO PROFILE

# ZEROING IN ON THE PURSUIT OF HAPPINESS

Does Zero VFX have the most contented workforce in the CG world? *Tom May* feels more relaxed already...



Zero VFX places great importance on giving its artists a good work/life balance

### STUDIO STATISTICS

**LOCATION**  
Los Angeles, Boston

**TEAM SIZE**  
68 employees

**KNOWN FOR**  
Photo-real visual effects and finishing services for commercials and feature films

**CO-FOUNDERS**  
Brian Drewes, Sean Devereaux

**SEAN DEVEREAUX**  
Sean is co-founder and creative director of Zero VFX. He has created visual effects for more than 50 feature films, including *American Hustle*, *Transformers* and *Fury*.  
[www.zerovfx.com](http://www.zerovfx.com)



Over two decades working in animation and VFX, you'd think creative director Sean Devereaux would have seen it all. But working at Zero VFX, the company he co-founded in 2010, never gets boring and continues to make him smile.

"Honestly, today is the high point, but tomorrow will be as well," he says. "We've grown and evolved so much in six years that every day brings a high point. Even the hard days bring a knowledge that allows us to continue to grow and build a place where we can create great work and have fun while we do it."

At the moment he's working on MGM's remake of *The Magnificent Seven*. "It's my first Western and I can't wait for the world to see it," he enthuses. "The cast is amazing and this is the most epic film I have ever worked on." But whatever the project, he clearly loves his work at the Boston-based company, which opened a second studio in Venice Beach, California, last November.

"I'm surprised at least once a day by an image that moves me more than I expected it to," he enthuses. "Or the look of pride on the face of an artist who

solves a challenging shot and knows it's better because they touched it." His colleagues tell a similar story: it seems Zero VFX is one happy place.

"The work environment is a big reason I came to Zero," says VFX supervisor Don Libby. "The company makes a huge effort to ensure a good work/life balance for the staff, a lot of whom have been here since the beginning. Everyone here is personally invested in the success of the company."

Lately the CG veteran has been working on *Magnificent Seven*, and before that, finalised work on this month's first-person spectacular, *Hardcore Henry*. It's dubbed the world's first action film to be shot entirely from the hero's perspective. And Zero's sequence, a wild highway chase, was one of the most challenging shots Don's worked on to date.

"It was designed to play as one long two-minute shot, but it was actually dozens of shots seamlessly stitched together," he explains. "It's a crazy frenetic shot where a cyborg takes down a convoy of armoured vehicles using a variety of weapons. He starts at the back



### DON LIBBY

Don is a CGI veteran with more than a decade's experience in the entertainment and automotive industries. He joined the team in early 2014 as CG supervisor and creative lead on projects.  
[www.zerovfx.com](http://www.zerovfx.com)





## OFFICE BRIEFING

Founded in 2010 by Brian Drewes and Sean Devereaux, Zero VFX is a visual effects and creative studio based on two coasts of the USA. The company works on commercial projects and feature films, which have included American Hustle, Black Mass, Fury, Southpaw and The Equalizer. In 2011, Zero VFX developed Zync Render, a cloud based rendering tool for VFX that was sold to Google for an undisclosed sum in August 2014. With headquarters in Boston, the company opened its second office in Venice Beach, California, in November 2015. This expansion marks a substantial scaling of operations in both the commercial and feature film sectors. This has helped Zero VFX to build an "extremely streamlined pipeline that screens out the noise and lets the creatives be creative."

of the convoy and works his way to the front, leaping from vehicle to vehicle. All first-person shooter style."

The main pipeline the team uses employs Maya, V-Ray and Nuke, he explains, "with most of our tracking done with syntheys. Now that we've expanded to LA, our FX capabilities have grown: we've also adopted FumeFX, Houdini and Krakatoa."

### BRIAN DREWES

Brian is co-founder and CEO of Zero VFX. With more than 20 years' experience in the VFX industry, he also oversaw the development of Zync.

[www.zerovfx.com](http://www.zerovfx.com)



Summing up what's so special about Zero is difficult, admits co-founder Brian Drewes.

"But I think everything boils down to this: if we can allow our creatives the ability to focus on each frame of their work, because that's what we and our clients are judged upon, we've succeeded. Everything falls out from there."

And if artists are fulfilled by their work, they tend to work hard – sometimes too hard, admits Sarah Spitz, executive producer and VP business development. "Our artists have such high standards that sometimes they have to be told to put the pencils down," she explains.

"Above all, we aim to have a work hard/play hard environment. We believe that if we work well and efficiently, we don't necessarily need to work long. When they can refill their tanks in the rest of their lives, they can bring their best selves back to their craft."

And if that sounds good to you, bear in mind they're recruiting. "We're seeking 3D generalists, FX artists, composers, matte painters..." says Don. "We're always looking to connect with talented artists across the board."



To learn more about Zero VFX and see more of the studio's work, visit [www.zerovfx.com](http://www.zerovfx.com)

## STUDIO PORTFOLIO



### BLACK MASS

For the real-life crime epic starring Johnny Depp and directed by Scott Cooper, Zero VFX helped bring Boston back to an era gone by, complete with snow and blood, matte paintings, set extensions, and all kinds of environmental augmentation.



### SOUTHPAW

The sports drama film starring Jake Gyllenhaal, Forest Whitaker, and Rachel McAdams follows the story of an undefeated professional boxer living in New York. Zero VFX added cheering crowds, built magnificent stadium architecture, and both emphasised and restored tattoos.



### NEW BALANCE

New Balance is an American footwear manufacturer based in Boston. For this campaign, Zero VFX conceptualized the creative idea with the agency, created previz and the NB 880 sneaker fully in CG, and animated and designed motion graphics.





FACE THE FUTURE

Facial performance capture evolves

REMEDY CHOOSES DI4D'S SOFTWARE

The highly anticipated Xbox One game Quantum Break makes use of the latest facial performance capture software to get film quality results.

HOW IT WORKS

The DI4D Pro System is able to obtain super high definition facial motion capture from an array of nine standard video cameras, without using markers, makeup or special illumination.

THEY'RE HAPPY...

"Quantum Break is a hugely ambitious project that combines action and narrative components in a unique way to bring the characters to life. The only way to achieve the high quality of performance was to create highly realistic digital doubles of talented actors," says Sam Lake, creative director of Remedy.



... AND POPULAR

Shortlisted for the 'Most Anticipated Game' at The Game Awards in LA on 3rd Dec 2015, the Xbox One exclusive will also feature a live-action TV show.

INDUSTRY FOCUS

# ENLIGHTENING YOUR FANTASY

How the new middleware that lightened up the world of Final Fantasy is going mobile, as *Alice Pattillo* discovers

It's often assumed that the advanced lighting achieved in visually stunning games is too expensive to scale into platforms like mobile, who suffer with restricted budgets, unless they have specialised hardware. However, Geomerics, an ARM company, has come up with a game-changer in Enlighten, which makes bespoke hardware unnecessary for rendering

In this market developers are increasingly turning to advanced effects, whether sound, gameplay or graphics, to stand out

these advanced lighting effects. Enlighten is a dynamic global illumination middleware available as an SDK for internal engines, through the Unreal Engine Integrated Partner Program and with Unity 5 as standard.

CHRIS PORTHOUSE

Chris is vice president of gaming middleware at ARM, and has held many senior positions at the tech giant.  
[www.bit.ly/arm-chris](http://www.bit.ly/arm-chris)



Chris Porthouse, VP of gaming middleware at ARM says, "Enlighten computes the effect of indirect lighting in real-time both in the game and in the editor. Instead of having to wait for lengthy bake cycles, art teams can see the effect of changes made to the lights and materials of a scene in milliseconds and iterate quickly to achieve their desired effect within a shorter time frame."

In terms of gameplay, this opens up new levels of creativity, "dynamic runtime effects such as time of day and player-controlled lighting are possible," Chris continues.

Square Enix used Enlighten on the highly anticipated Final Fantasy VII Remake, the new lighting technology that will add a fresh look and feel to the iconic game. But Enlighten also has the ability to scale from a PC title this size, down to a more budgeted platforms – specifically a mobile game. "Enlighten can scale across all of today's gaming platforms, delivering high-quality output across PC, console, mobile and virtual reality devices."

## Portable popularity

Chris says there are a number of industry trends that have led to Enlighten's popularity. "The performance capabilities of mobile devices have increased hugely in recent years." He continues, "A second point to consider is mobile market saturation. Almost 400 games are being released each day onto the App Store. In this crowded marketplace, developers are increasingly turning to advanced effects, whether sound, gameplay or graphics, to stand out. Thirdly, franchises which have traditionally been the reserve of PC developers are turning to mobile as it proves itself to be an important gaming platform."

Aside from Final Fantasy VII Remake, Geomerics is working with independent award-winning studio, Exient on a game to push the capabilities of mobile platforms.

**FYI** Swat up on Enlighten and discover how the tech is developing video game art at [www.geomerics.com/blogs](http://www.geomerics.com/blogs)

Direct and indirect light as delivered by Enlighten, which can be scaled across multiple platforms





LOSE YOURSELF IN A WORLD OF

# *Vinyl*

FIND YOURSELF IN  
OXFAM'S ONLINE SHOP

[oxfam.org.uk/shop](http://oxfam.org.uk/shop)



OXFAM





## ARTIST INTERVIEW

# MODEL CITIZEN

**James Abell** explains the secrets behind his 3D printed instectoid

James Abell mixes 3D printing and other maker technologies with traditional art elements, and you can see the results in these stunning sculptures. We liked them so much that we wanted to find out more – beginning with: why ants and bees?

### JAMES ABELL

James creates art with a twist of the future. He also has a passion to transfer what he learns to others through tuition and lifelong learning. [www.jamesabellart.com](http://www.jamesabellart.com)



"They're a common theme in my 2D and 3D artwork," he explains. "They hint at how collective species like these resemble humans in some ways in our cities. I also like these creatures as they are a homage to retrofuturism. Saul Bass made a film called Phase IV in 1974 which was a big influence on me – check it out."

Modern artists provided an influence too. "I like artists who use 3D printing with retrofuturistic elements," he says. "I just found the artist Micah Ganske and am looking more into her work. Also, I always find the artists who emerge from the Pier 09 Autodesk Residency in San Francisco residency really interesting."

James used 3ds Max poly modelling, Symmetry modifier and the Paint

Deformation tool to help get the proportion and 'flow' of the anatomy. "I also used a lot of Google images from photos of Red Fire and Honeybees to get the anatomy looking good."

Working on an ASUS Republic of Gamers GL552VW 15.6" Gaming Laptop, he used 3ds Max 2015, Blender 2.76, Cura, SketchBook Pro and also the 123D suite from Autodesk. "I'm also trying to get into Autodesk's Fusion 360," he adds, "so I don't have to guess when I need more accuracy with future 3D prints with joining mechanisms, for example."

As for 3D printers and other maker technologies, James uses fab labs and makerspaces. "For example, MakLab in

**They're a common theme in my 2D and 3D artwork... they hint at how collective species like these resemble humans in some way**

Glasgow and I also worked with FabLab London, so used their machines too. It's really important to join and support these places wherever you are in the world, it is a new industrial revolution!"

Deciding how much detail to go into with his models was tricky. "I decided to stop in 3ds Max," he says. "Sure, I could have taken them to ZBrush to add finite details, but with 3D models the details can get lost with lower print resolutions," he reasons.

Printing provided an added technical challenge. "The ants and bees proved difficult on the Ultimaker printers. I got them made but the quality was woolly and the 3D printer had to print such a large amount of support structures, it was almost impossible to take these off to get to the models."

To sell his models, James uses the online printing service Shapeways. "They have a really good application after uploading a 3D mesh that enables any fixes so the screening is good prior to letting you print," he says.

**FYI** Find out more about James's work at [www.jamesabellart.com](http://www.jamesabellart.com)

### TIPS FOR 3D PRINTING

*Advice on getting the perfect prints*

### THINK LIKE AN ENGINEER

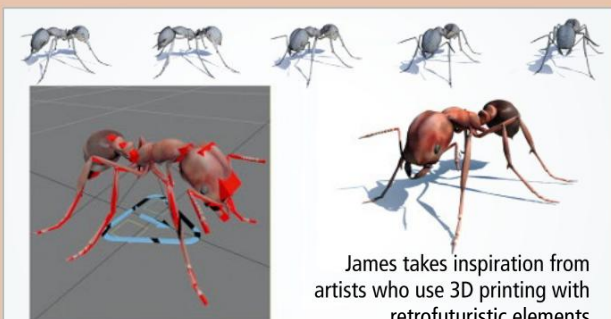
"Your model will be in the real world, not a flat screen," says James. "So you need to think of how it will react to real world things, such as force and gravity! When you start getting your head around this, it is a fascinating thing to grasp!"

### SPEED TIP

"3D printing can be pricey and take ages," says James. "If you hollow out large areas that are solid it can help save time and materials. Just not too much or they might collapse!"

### RIGHT SOLUTION?

"Sometimes consider if the 3D printer is the best solution for the task," adds James. "For example, if you are making a very large model you should look into using Autodesk's 123D Make to get it lasercut."



James takes inspiration from artists who use 3D printing with retrofuturistic elements





# BLENDING REALITIES

In 2016, FMX transforms reality as we know it. Taking place under the headline "Blending Realities," FMX thinks outside the box and looks at VR, AR and beyond. Further topics in 2016 cover, amongst others, the latest trends in VFX in Commercials, the Virtual Humans Forum, Lighting & Rendering, Disruptive Technologies, Directing for VR, Realtime Storytelling, Layout and Set, Tools of Tomorrow and Cameras & Pipelines. Come to Stuttgart, join the journey.



**FMX**2016

April 26-29, Stuttgart, Germany  
[www.fmx.de](http://www.fmx.de)





## EXPERT PANEL



### **Gaëtan Lassagne**

Gaëtan is a senior technical artist at Allegorithmic in France.

He's also a part-time teacher for technical art students.

[www.gaetanlassagne.wordpress.com](http://www.gaetanlassagne.wordpress.com)



### **Fady Kadry**

Fady is a senior generalist with over five years' experience in the VFX

and animation industry, working on TV commercials, film and music videos.

[www.fadykadryart.com](http://www.fadykadryart.com)



### **Francis-Xavier Martins**

Francis-Xavier is a character artist and CG

generalist based in Brighton. He's worked in video games, media and TV.

[www.polyjunky.com](http://www.polyjunky.com)



### **Mike Griggs**

Mike is a UK-based freelance 3D, VFX and mograph artist, who has

been polishing pixels since 1995 for broadcast and commercial projects.

[www.creativebloke.com](http://www.creativebloke.com)



## GET IN TOUCH

EMAIL YOUR QUESTIONS TO  
[ian.dean@futurenet.com](mailto:ian.dean@futurenet.com)



## ARTIST

# Q&A

Your software queries solved  
by our CG experts





## How can I texture and look develop a leather material?

Rupert Moore, UK



### Fady replies



Hopefully as I explain my workflow and the techniques I used to finalise my warrior character, you should get a good idea about how to lookdev and texture a leather material.

The warrior project was a personal project with the aim of practising and pushing myself and my workflow out of my comfort zone. I intended to go beyond what I am used to do in my work to date, which is sticking to a limited number of maps and not going above a certain resolution for each map.

With this project I had a goal, which was to reach a maximum resolution without getting into the nightmare of blurred textures in a close-up camera situation. Thankfully I succeeded in doing so, however I had to paint almost 254 UV patches in 4K map size. That ended up totalling 1016 maps between Diffuse, Spec, Bump and Displacement maps.

**I use Vector Displacement maps as they are more accurate and less hassle when it comes to setting up**

From ZBrush I exported three sets of maps: 32bit Floating Displacement maps, Vector Displacement maps and Normal maps. I use Vector Displacement maps as they are more accurate and less hassle when it comes to setting up. They're also faster when exporting from ZBrush.

The other types of Displacement maps are used in conjunction with Bump maps, in order to give extra accent to the details. Normal maps are used to guide me through the texturing process. In addition to this, I also use AO maps as these are very efficient and also help guide me through the process, as well as adding extra dimension to flat textures.

During this project I had to tackle the process of building a solid leather texture and shader that would form the majority of this character's costume (almost 90 per cent). Using Arnold as my main render engine led me to investigate further the leather material properties (Diffuse, Roughness, Specular, and so forth).

### EXPERT TIP

#### Consider your material

When you start texturing your props you should always bear in mind the material type this texture will be applied to, and what contribution each map will give to the material.

## STEP-BY-STEP TEXTURE AND LOOKDEV A LEATHER MATERIAL

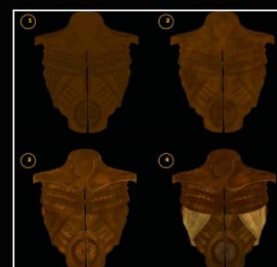
### ONE GATHER YOUR REFERENCES

Gathering references is very important as it gives you an idea of what type of material you are going for and also what the properties of this material are – for example fabric, leather, metal, and so forth. In this case, I am going for a worn and old looking leather that has been used before and therefore has some imperfections to it.



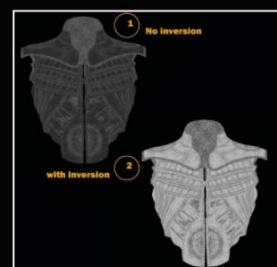
### TWO BUILD THE DIFFUSE LAYER

After finding the references and source materials it is time to start building the main component, which is the diffuse layer. In order to achieve a rich looking leather material you need to layer different source materials together. In this case I used a tileable leather texture as a base, then I started to hand paint layers on top of it from different sources.



### THREE BUILD THE SPEC COMPONENT

Now it's time to build the spec component, which is very important, but in leather cases is tricky. You need to look for where the direction of the grains and cracks are when building the spec maps; they will play a very important role with the shader. Don't just desaturate the diffuse component. If needed, desaturate and invert so you get the correct result.



### FOUR USE ARNOLD SHADER

Working with Arnold shader is very straightforward. You need to know some key points, like the diffuse weight of the different material types and the spec colour and weight contributions of these materials – whether they are dielectric material or non-dielectric material. In the leather case, it's a dielectric material which means it has a non-white specular colour and low fresnel contribution.





## SUBSTANCE DESIGNER | PAINTER

### How can I achieve smooth texturing with hard surface models?

Cassie Crawley, USA



#### Gaëtan replies

Hard surface 3D models are nice to texture as they can come with a large variety of materials and some used/weathered effects on them, which let you imagine the functionality and story of the object. In order to get a smooth texturing workflow you have to take several things into account.

The first thing is to prepare your UVs for baking. This way you'll be sure to get accurate results by reproducing all the details from your high-poly mesh on your low-poly version.

Define your smoothing groups according to your UV seams in order to avoid issues; visible lines in the Normal map for example, created by hard edges/smoothing groups transitions in the mesh.

If you have identical parts with overlap in your UV, do an offset (of one unit) on the duplicated ones to bypass them during the baking. This way you'll preserve the optimisation and get a correct result during the baking process.

In Substance Designer/Painter use the Match by Name option for the baking. This will use the meshes' names to give a perfect correspondence between

Add life in your textures by creating small scratches and relief imperfections; don't forget to be coherent with the material type

your low and high poly. It's always useful whether it is a character or a weapon you are doing.

Use mesh information through baked maps. For example ID maps quickly create masks for the different parts; use it as an additional map in a Substance Painter project, or as a source for a Multi-Material Blend node in Substance Designer. Use Ambient Occlusion to localise some dirt in the concave areas of the mesh. You can damage exposed areas (borders) by using Curvature to create some paint peeling, cracks and scratches.

Add life in your textures by creating small scratches and relief imperfections. Don't forget to always be coherent with the material type (its real-life properties).

Adapt it. For example, if you add dirt to the part/context, you'll not add the same type if it's a fuel tank, a weapon barrel, or a part subject to frictions.

It can be really subtle; the amount and intensity can vary with the style, but when possible it will make the result more believable.

#### EXPERT TIP

##### PBR texturing

This allows you to quickly define material properties. Assign base materials (with uniform values) using your ID map to get something interesting, then add specific details based on the surface properties.

### STEP-BY-STEP TEXTURE A HARD SURFACE MODEL

#### ONE BAKE DIFFERENT MAPS

By baking different maps, you're able to get information for your mesh without having to paint/create them from scratch in the textures. In Substance Designer use filters from the Mesh Adaptive category of the Library and fill with baked information. In Substance Painter, add a generator on your layer mask by right-clicking on it. This will automatically use your document's additional maps to parametrise the effect.

#### TWO ADD DIVERSITY TO YOUR MODEL

Add some contrast/diversity – it doesn't necessarily mean you have to use different colours, it can be variations in your materials. Alternating with plastic/metal/painted metal/glass parts will make each material (and your model) more appealing. Even for similar materials, if two parts use plastic, they can also be different if the parts haven't got the same purpose.

#### THREE MAKE MATERIALS BELIEVABLE

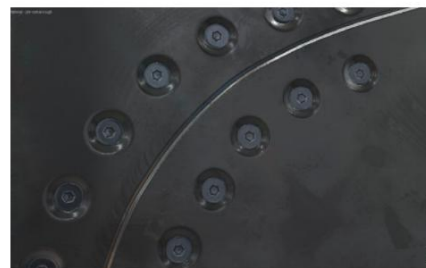
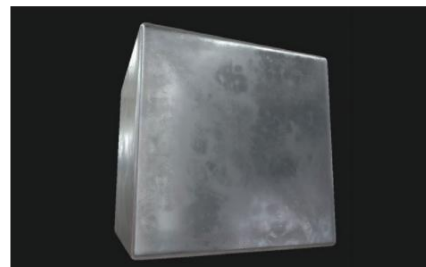
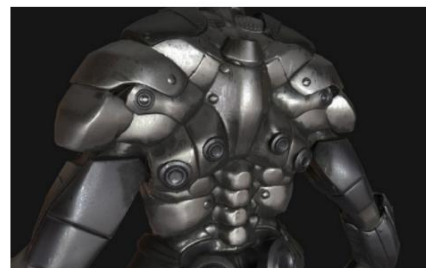
Use the Grunge maps in Substance Designer or Substance Painter in order to quickly create interesting variations on the material's reflection. By adding some higher roughness values you are able to quickly achieve more believable materials by adding some life to them. They can then also help you to get colour variations.

#### FOUR CREATE YOUR OWN TOOLS

Use Substance Painter tools to quickly paint details like bolts on all the channels at the same time (Albedo, Normal). By creating your own tools with custom alphas, you can quickly add nice details. By doing them directly in textures, you'll not have to paint over your baked normal and will be sure to get something perfectly coherent without having to paint several times the same element on different maps.

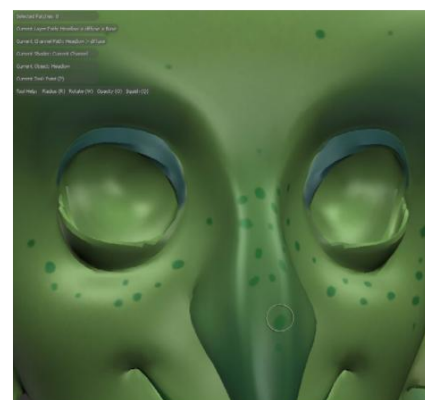
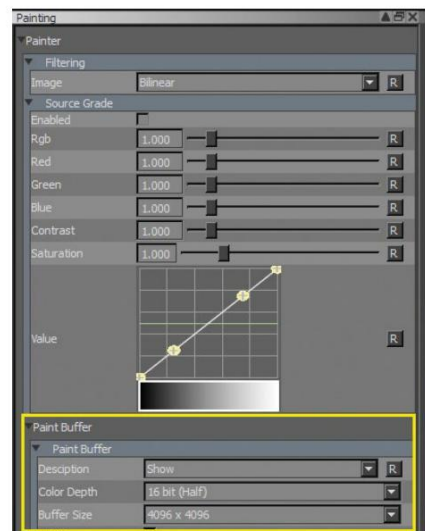
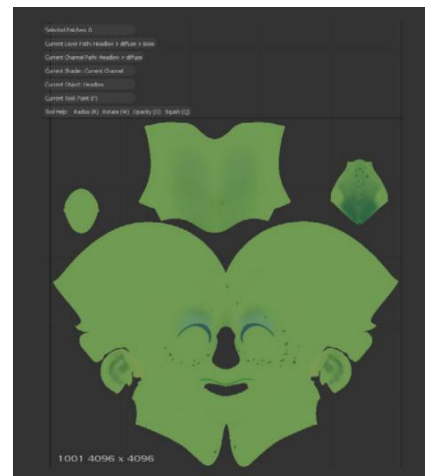


3D models come with various materials and weathered effects, making them good to texture





Francis-Xavier used Mari in order to texture and colour this cute witch



## EXPERT TIP

### Buffer size

Make sure your buffer size is equal to, or if your system can handle it, greater than the size of your final texture. Anything less and the texture quality suffers on export. Go to Painting tab > Paint Buffer and change the resolution to the desired value.



## How can I paint a bust in Mari?

Sarah Cole, Australia



### Francis-Xavier replies

I decided to sculpt and render a cute witch based on a lovely concept I saw by Max Grecke. I was certain I wanted to render it in Maya so I textured it in Mari using UVs done in Maya.

I've been fortunate enough to use Mari for a few television projects so I'm familiar with its navigation controls, which you can change under the Navigation tab in Preferences. I use Maya often, so I changed it accordingly.

Getting started, you open a new project and then point to the path where the Obj is. Once that's in, go to the Channels tab, right-click on Diffuse, resize and then choose the size of the texture you need. I went with 4096.

Think of painting in Mari like spray painting on a thin film of cellophane; as

soon as you drop something on it, the object gets covered. This is 'baking' in Mari. It's easier if you have a shortcut, for which mine is 'B.' Bake behaviours in Mari vary, but I like mine set to Clear Only as this means I have control over when the area I've painted is cleared. You can change this in the Projection tab.

I grabbed a soft brush from the Shelf tab and painted my base colours on the model. If any of the tabs aren't visible, just right-click anywhere on the UI and click the tab you need.

Since you have layers, you have complete control of what you paint, the opacity, and you even have the ability to add masks and adjustment layers like you would in Photoshop.

If you have already baked your colours down and don't want to use a mask, just change your painting mode to Clear and

your brush will then act like an eraser. Then on a new layer, I chose a new colour and painted in her freckles. The controls for each tool is on a HUD for easy use, so by holding down [R] I could quickly change the radius.

If you have already baked your colours down and don't want to use a mask, just change your painting mode to Clear

Once you have finished painting your bust, right-click a layer in the Layer Diffuse tab, then export all layers flattened and name it. This should include the extension you need, so then you can use it in the rendering program of your choice.





## What advantages does a cloud render service like Zync offer?

**Richard Davis, UK**



**Mike replies**



Using a cloud render farm can have a transformative effect on digital content creation workflows if used properly. They can help when deadlines are tight, save a huge investment – both in terms of hardware and maintenance of creating your own render farm – and can also enable the rendering of huge projects if you are away from your main workstation.

However, it can be complex managing assets and uploads that can potentially create a whole new range of problems.

Zync was already a leading cloud render service, with tight integration in Maya across a range of render engines such as Arnold and V-Ray, which allowed upload and checking from within Maya itself, minimising the pain of using a cloud render service.

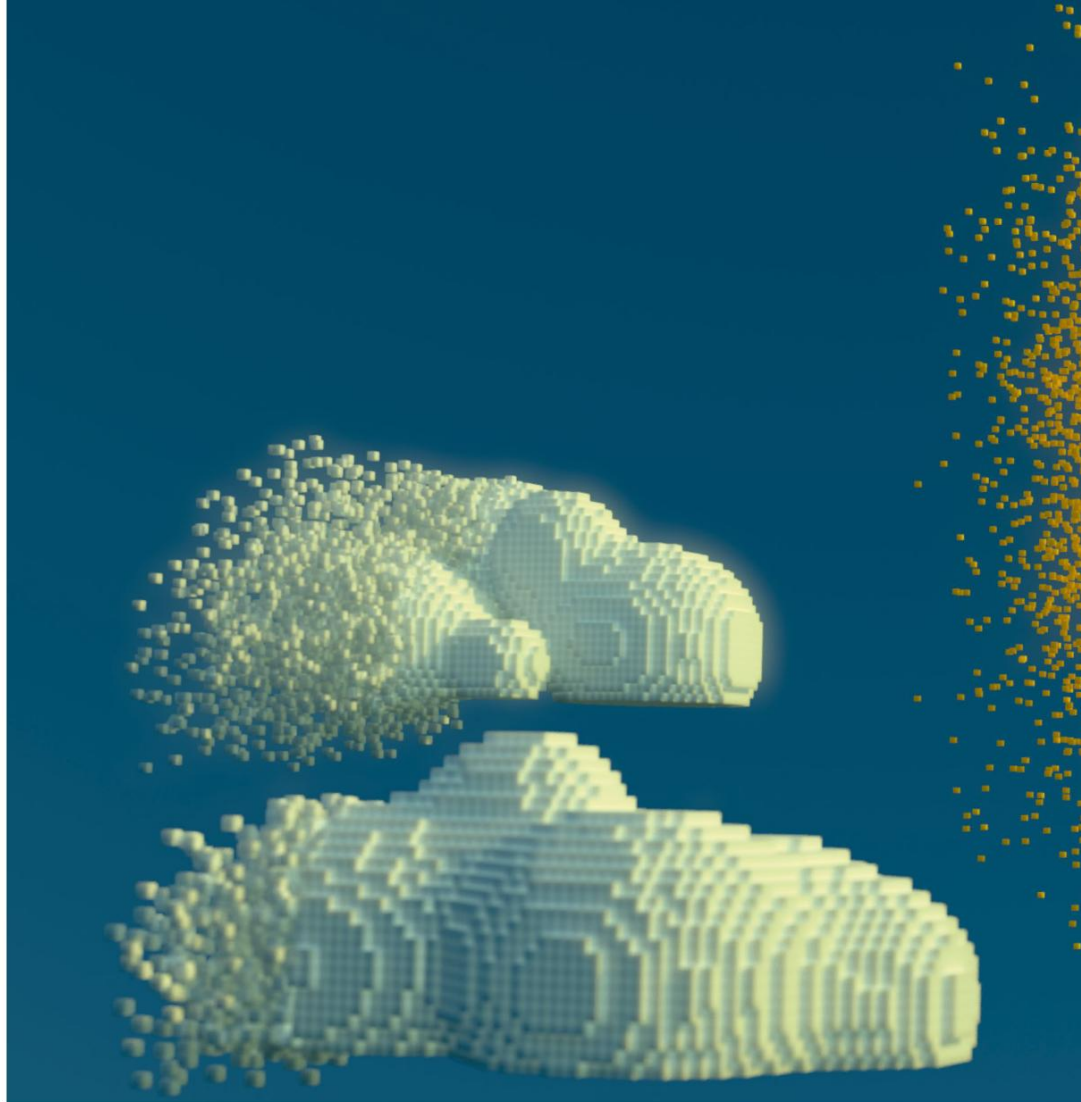
Zync was bought by Google and are now offering excellent integration with software such as Maya and Nuke backed up by Google,

Zync can be leveraged in cross platform environments, whether the artist is at home or on site

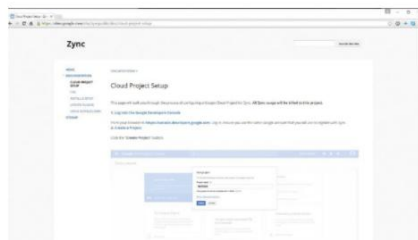
who know quite a few things about computers and the internet apparently.

One of the key ways that a cloud rendering service can change the way you work is that it frees up your main work machine for other duties, which can be a huge timesaver – especially when animating. By using a service like Zync, the artist has instant access to as many computers on the cloud as they need. With each frame rendered in parallel, rather than in sequence, as they would be on a single workstation, render times come tumbling down from hours to minutes.

This saves huge amounts of time meaning that each frame can be optimised for quality rather than speed. When used with a render engine such as Arnold, Zync can be leveraged in cross platform environments, whether the artist is at home or on site with their laptop, and even when the artist only has one Arnold license for their main render machine.

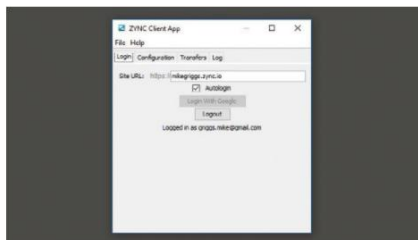


## STEP-BY-STEP GETTING STARTED WITH ZYNC



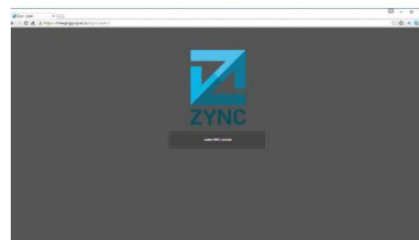
### ONE SET UP THE ZYNC ACCOUNT

It's best to set up a render cloud solution at the beginning of a project. To set up your Zync account, you'll need a Google account to access the Google server, which Zync uses. You'll also need access to a credit card to set up your billing account, visit [www.bit.ly/206-zync](http://www.bit.ly/206-zync) to find instructions on how to set up your Google Cloud render account.



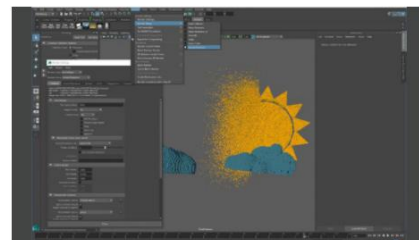
### TWO INSTALL ZYNC

Zync works by installing a small application on your computer which manages the connection from your computer to the Zync cloud infrastructure. The faster your internet connection, the better and quicker Zync will be. The Zync application must be running for you to use Zync properly. The apps are free and are available at [www.download.zyncrender.com](http://www.download.zyncrender.com)



### THREE INSTALL ZYNC PLUG-INS

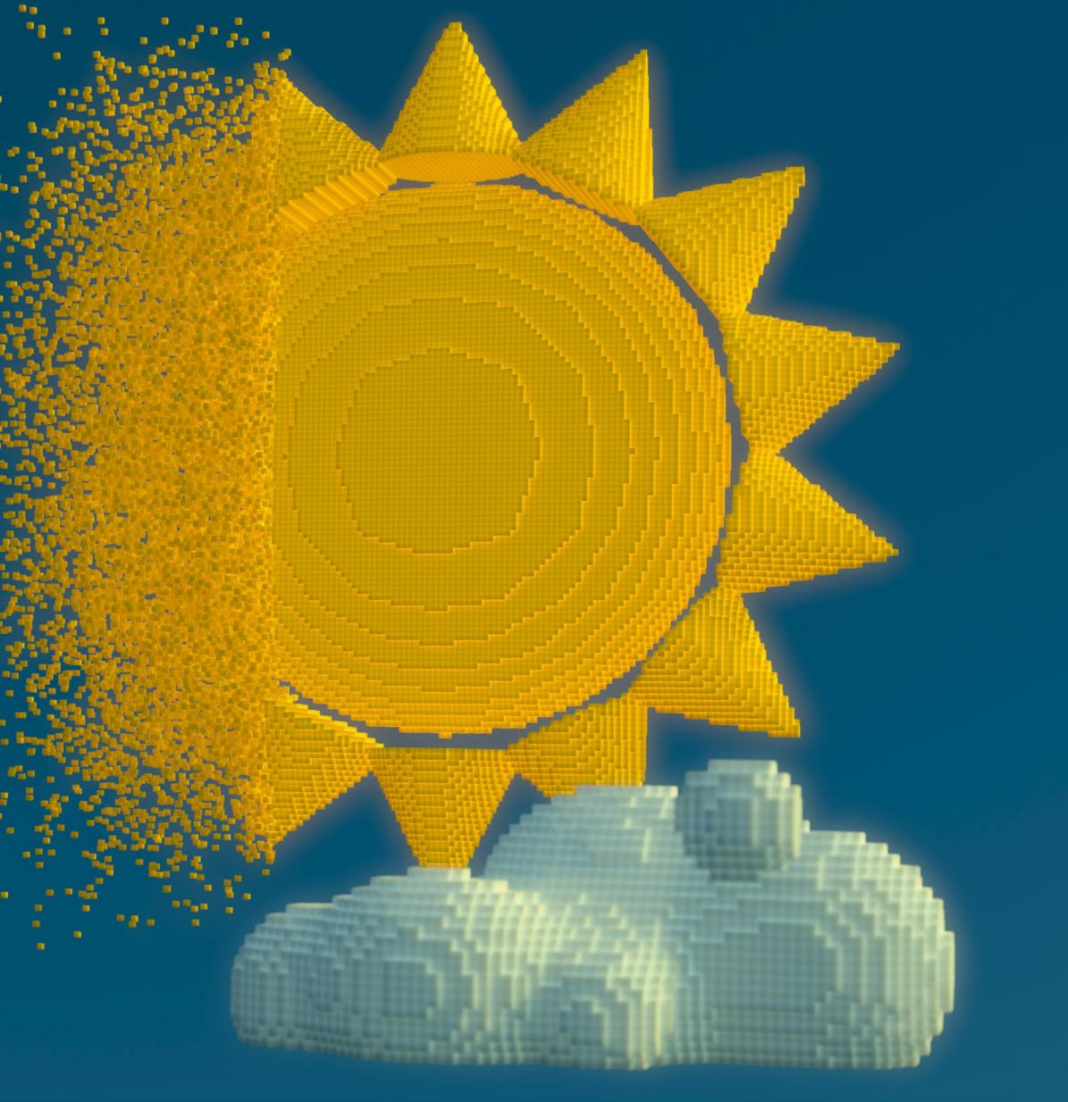
Once the main Zync application has been installed, install the plug-ins from the same page as the main Zync app [www.download.zyncrender.com](http://www.download.zyncrender.com). At this point you will need to access your main Zync project page, which you should have received an email about after your set up. This is in case you need to access Application API keys.



### FOUR SET ARNOLD SETTINGS

In Maya, ensure Arnold is set as your default render. Use the Arnold demo setup which creates watermarked renders if used on your local machine. This combination of Maya and Zync means even if you have one Arnold license on the workstation and you're working on a laptop, you can still review your scene in Maya and send to Zync for final render.



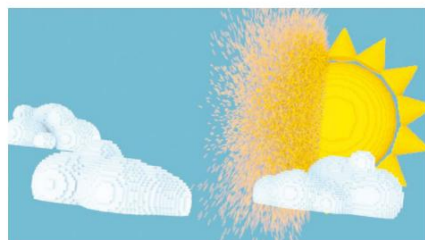


A cloud rendering service like Zync can free up your main work machine for other duties

## EXPERT TIP

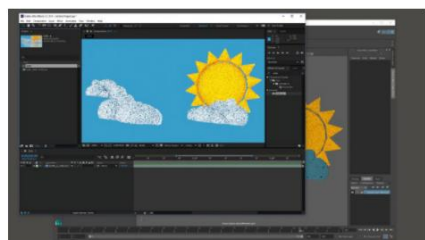
### *Save yourself some time*

If you have a large amount of assets, such as textures and/or have a slow internet connection, create a Zync job in Maya as it is best to get these onto the Zync servers as early as possible. In Maya use the Zync panel and make sure that the Upload Only checkbox is ticked. This puts the assets onto Zync ahead of time so that when deadlines are tight, time is not wasted waiting for the assets to upload.



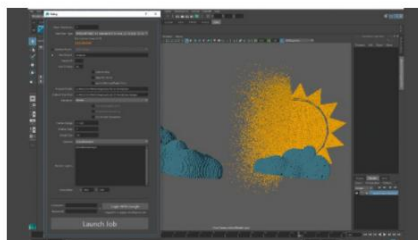
## FIVE TEST FRAMES

If you're running on a machine with a licensed copy of Arnold, it's good to run out test-frames of your animation on your local machine to check the render quality. In my case, a frame takes 10 minutes so it would take 20 hours for my machine to render the animation, instead of less than an hour than it would take using Zync from start to finish.



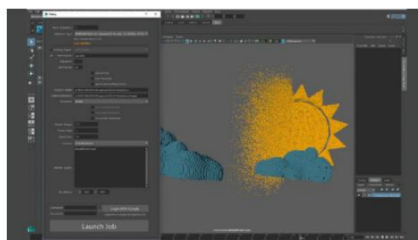
## SIX CREATE A LOW-RES ANIMATION

It is also a good idea to run a test animation using a lower image resolution size, and dropping back the Arnold AA samples to 1 or 2 so that the scene renders much quicker than the final version. Due to the way that Arnold renders your scene, you will still get an excellent impression of how your animation will work.



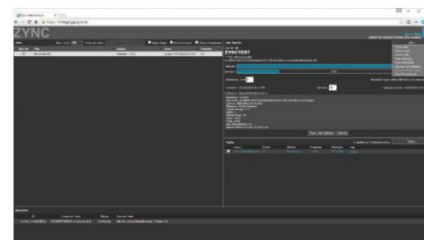
## SEVEN OPEN THE ZYNC PANEL IN MAYA

After the tests have run and the render settings are set back to the final render quality, it's time to send the animation to Zync. If Zync is installed there should be a Zync shelf in Maya. Press the Zync icon in the Zync shelf to open the Zync dialogue. Press the Login with Google button at the bottom of the panel to ensure Zync is working with your account.



## EIGHT UPLOAD TEST SCENE TO ZYNC

As with step 5, it is good to run a quick test sample to Zync to make sure everything is working, and it will also allow the final cost on Zync to be calculated for the main render. Create a New Project in the Project Settings of the Zync panel, set the frame range to a couple of frames only to test the render. Hit the Launch Job to send the Maya scene to Zync.



## NINE THE ZYNC PAGE

On the Zync Project page you will see the test job running. Use the Job dropdown at the top right of the screen to pause, cancel or even change the settings of the job itself, including the amount of machines that you are using, or the job priority.



## TEN SUBMIT THE FINAL JOB

Once the test job has finished the renders will appear in your Maya images folder. Check on the Zync page to see how long the test took per machine and use this calculation to finalise your render cost. Redo steps 8-10 and just change the frame range to that of all the required jobs and submit the final scene to Zync.



FEATURE

Targeting real-time hair

# Targeting REAL-TIME HAIR

*Epic Games' Brian Karis and  
Jordan Walker reveal  
how they used the  
latest tools in  
Unreal Engine 4.11  
to render hair in  
video game,  
Paragon*

Game:  
Paragon

Developer:  
Epic Games

Software:  
Unreal Engine 4.11

Release:  
Summer 2016





**Brian Karis**

Brian is a senior graphics programmer at Epic Games and has over 10 years' experience in the games industry.

[www.bit.ly/BrianKaris](http://www.bit.ly/BrianKaris)

Real-time software is becoming more relevant in CG; it's crossing from games into arch-viz, animation and even film production. One of the key players in this arena is Epic Games, and with the release of Unreal Engine 4.11, developed with new game Paragon in mind and photorealism at its core, they're getting closer to impressive lifelike results.

"Improving our ability to render photorealistic human characters is one of Epic's big goals for Paragon," says Brian Karis about the new Massively Online Battle Arena (MOBA) game designed to showcase the new render tools in Unreal Engine 4.11.

There have been many areas to improve upon for Epic's team. One of the most difficult has been hair. "Up until now we've lacked a solution for hair in Unreal Engine 4, and in every previous demo we have found some way to avoid or hide it," admits Brian, who says it's now time to tackle the task head on.

There are some major aspects to hair rendering the team have needed to solve: geometry, anti-aliasing, lighting and shading, and simulation, and these will be covered by Brian on the next page, but he explains: "For Paragon we haven't felt the need to implement a fancy new system for simulation, and instead have used traditional rigid body physics where appropriate. We've focused their efforts on the other categories."



**Jordan Walker**

Jordan is a CG artist at Epic Games, where is credits include Gears of War 2, Gears of War 3 and Infinity Blade.

[www.mutantspoon.com](http://www.mutantspoon.com)

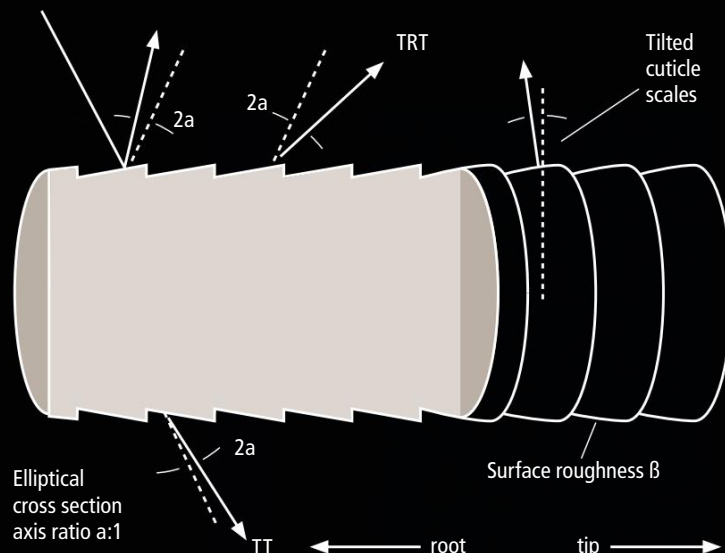


## FEATURE

Targeting real-time hair



N°2



N°3



Because Paragon is a high-performance game with many characters that need to run on consoles, completely spline-based hair is not high-performance enough for Epic's requirements. Instead, they have kept with bent sheets for the hair.

"This means our character modellers create a texture sheet with various clumps of hair, then map those to low-polygon sheets that they then layer on the character's head. Although this can be more time-consuming to create it can be much more efficient in the number of polys in the end result," says Brian.

In some situations, where a character has a ponytail or a large mass of hair (see image N°1), the team will create a low-polygon volume of hair that has sheets layered on top. "This helps us avoid having too many sheets draw on top of each other which is not good for performance," he explains.

### Anti-aliasing

Brian explains the best way to get hair that seems light and feathery, without a lot of aliasing, is to use translucency. But this has some nasty sorting issues. More concerning is the performance cost to have high-quality shading and multiple layers or overdraw.

"We also don't have strong support for lit translucency in the engine due to the use of deferred shading," says Brian. "Instead we gamble on a cheap but low-quality form of OIT through dithered opacity. This either draws or doesn't draw a pixel that frame with

the probability of the amount of opacity it has. Combined with our Temporal AA technique, it mostly works as a way of faking translucency without blending. The advantage is only shading once per pixel and it working with our deferred shading architecture."

### Do it the Weta way

Epic has drawn from the latest research in film for their physically-based hair shading model. "Primarily it is an approximation to the shading model that Weta uses for their hair," admits Brian. (Diagram N°2 above shows the basic physics of what happens when light hits hair).

Brian says there are three main components of light reflection for a hair fibre: R = reflection off the front side of the hair; TT = transmission coming out the back of the hair; and finally, TRT = transmission through the hair, reflects off of the backside of the strand and then transmits through the front. "There can be a TRRT or a TRRRT, but they typically get so dim they aren't visible."

The colour comes from absorption when the light travels through the hair. Black hair absorbs almost all light, whereas white hair absorbs very little. Red hair absorbs G and B more than R. Every time the light travels through it gets absorbed more, so more times through is like raising the colour to a power.

"Hairs have scales on them," reveals Brian. "This makes them not perfect cylinders but more like a stack of cups. That means the highlights shift." (Read: The Science Bit).

{Emulate reality}

## CANDLE WAX EFFECT

Another effect to replicate in games is the 'candle wax' look (image N°3). "This could be simulated very slowly through brute force in a path tracer, but in real time we need aggressive approximation, and sometimes, brutal hacks," says Brian. "In this case we use the distance that the light ray travelled after hitting the first hair strand and calculate the amount of absorption that would happen if the volume of hair was uniform.

The distance the ray travelled can be approximated using the distance that the pixel is from the value in the shadow map.

The further the light travels, the more saturated it becomes."



{The science bit}

## HAIR IN REALITY

You'll notice R (reflection), the primary white specular highlight, is typically shifted away from the root towards the tip.

TT (transmission out of the hair) has to be seen from the other direction. It is the light glowing through from the other side. Since it only passes through the hair once, instead of twice like TRT (transmission through the hair), the colour is less saturated.

TRT, the secondary specular highlight, is typically shifted towards the root. The direction of shift can be confusing since it is based on whether the hair curves toward the camera or away. Notice the first highlight is coloured and then white, and the second is white and then coloured.

The last effect isn't something in the hair strand at all. It is the result of many hairs interacting, and is called multiple scattering. A light ray can do either R, TT, or TRT multiple times from one hair to the next, before hitting your eye. This is most visible with light hair, because dark hair absorbs the light almost immediately.

### VIDEO#1

[www.bit.ly/ue4-video1](http://www.bit.ly/ue4-video1)

### VIDEO#2

[www.bit.ly/ue4-video2](http://www.bit.ly/ue4-video2)

### VIDEO#3

[www.bit.ly/ue4-video3](http://www.bit.ly/ue4-video3)





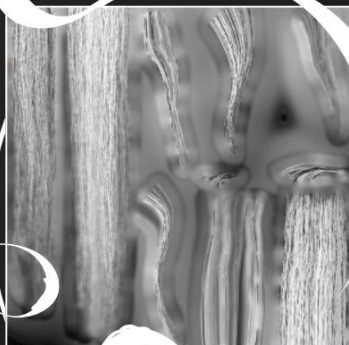
## FEATURE

Targeting real-time hair

Nº1



Nº2



### Artist setup

For Paragon, Epic wanted to create one master hair material that achieved three goals, says Jordan Walker: "[To] support many hairstyles, have easy-to-create input textures and meshes, and be as optimised as possible from a rendering standpoint."

For input textures, Jordan's modellers generate four texture sheets, explaining:

**Nº1 ALPHA:** Standard alpha texture that avoids very transparent values.

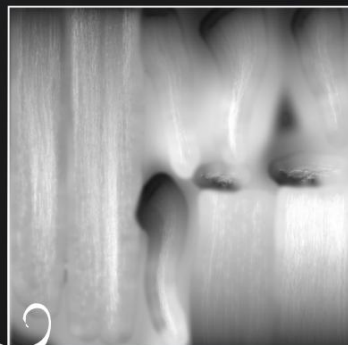
**Nº2 DEPTH:** When rendering the sheet of hair, we give hairs that are on top a brighter value than hairs on the bottom. This lets us utilise a feature called Pixel Depth Offset. We're able to offset how the sheet of hair blends with other surfaces. This adds complexity to the intersection of hair sheets and the head.

**Nº3 ROOT:** This is a simple gradient along the length of each hair, where the root is black and the tip is white. This texture allows us to fade out Pixel Depth Offset blending towards the tip, as well as adjust hair colour and specularly along the length of the hair.

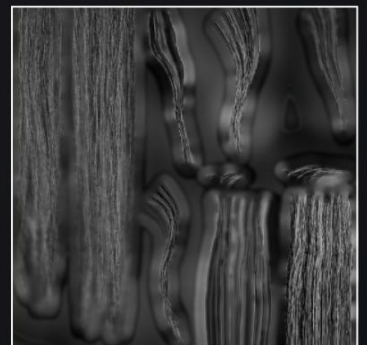
**Nº4 UNIQUE HAIR VALUE:** Each hair should be a different greyscale value. This helps us add variation to the colour of each hair. It also helps us adjust the tangent of each hair slightly so the specular highlight has some offset along the length.

**Nº5 BASE COLOUR:** If we need a lot of specific colour variation over the hair, we can enable a colour texture that is mapped to the second UV channel of our hair sheets. This allows us to add interesting colour for creature fur.

Nº3



Nº4



Nº2<sup>b</sup>



The following images show the difference between having Pixel Depth Offset disabled versus enabled



"When adjusting hair materials it's crucial to have good reference," says Jordan explaining: "Hair is a very complex surface and tweaking material values can be tricky." For Paragon, Epic turned to photos of hair in controlled lighting situations. These lighting scenarios were then recreated inside Unreal Engine 4.11 making it easier to achieve a photo-realistic look.

"Seeing the two next to each other helped us to refine the model in the shader to what you see on this page," shares Jordan. The shader used to create Sparrow's hair, along

## Improving our ability to render photorealistic human characters is one of Epic's big goals for Paragon

*Brian Karis, senior graphics programmer, Epic Games*

with that of many other characters in Paragon, is now available in Unreal Engine 4.11, from the Epic Games Launcher.

"We've only touched on the how we approach hair rendering in Paragon, using Unreal Engine 4.11, but there are more new tools available in the software and it's free to download and use non-commercially," encourages Jordan. So why not try it out for yourself? There's training and advice on the Epic website for all CG art standards.

**FYI** See more of Epic's work on Paragon at [www.epicgames.com/paragon](http://www.epicgames.com/paragon)



{Get started}

## DISCOVER THE NEW TOOLS OF UNREAL ENGINE 4.11

You can download and start using Unreal Engine for free today, just visit the site at [www.epicgames.com](http://www.epicgames.com) to begin. There's plenty of training videos, free asset packs and sample game levels and art to get you up to speed.

The latest update of the Unreal Engine (4.11) features improvements to skin subsurface scattering (SSS), as well as a new eye shading model and material. There's also a new cloth shading model, which includes high-quality motion blur for cloth. Plus, of course, there's the new Weta-influenced hair shading model as described on these pages.

Paragon, the game being developed using 4.11's new tools, makes heavy use of parallax occlusion mapping (POM) for detailed displacement, combined with pixel depth offset for smooth and accurate intersection of meshes.

Epic has also created a volume raytracer for texture heightfields that

treats 2D textures like volumes, to render convincing clouds and smoke.

Paragon uses new procedural foliage features, which uses a procedural foliage Blueprint, that simplifies the creation process for tree roots, vines and ivy placement. Foliage has the ability to trace level geometry to grow around meshes, or to draw freestanding trees.

Paragon also has early support for full hierarchical wind through upgrades to UE4's Pivot Painter tool, enabling the creation of numerous foliage in-editor or in 3ds Max, which all uses the same wind properties.

Finally, Paragon makes use of light channels to provide the ability to mask lights to only affect particular objects, and capsule dynamic soft shadows are used to give the characters broad soft shadows when in the shade, in order to better integrate.



Photo reference (far left) was used to ensure the in-game hair shader matched reality perfectly (right)



## FEATURE

Power-up your career



# MAKE YOUR MOVE INTO THE GAMES INDUSTRY...

*Ian Dean* speaks to leading artists from Insomniac, Naughty Dog, Cloud Imperium Games and more to discover how to become a winner on a video games art team



**B**reaking into the games industry and landing a role on a leading art team is fast becoming the dream for many CG artists. But how do you get noticed, wedge your foot in the door, and kickstart your career? To get the best insight possible we've gathered together artists and art directors from some of the world's leading game studios, including Naughty Dog, 343 Industries and Guerilla Games to pick their collective brain.

The starting point is a simple one: get noticed. If you're trying to get a job in the industry as an artist and don't have an online portfolio, that's your first task. Dan Roarty, lead character artist at Epic Games says,



"Post, post, post! To be honest, there is no better way of getting noticed than sharing your work with the art community. ArtStation and social media groups get the most exposure."

Try entering a contest; not only does entering help to improve your portfolio and get your work shown, these events are also monitored by companies and sponsors.



"The CG Student Awards [now called The Rookies] provided a deadline for me to get all of my work together and showcase it to see what the professional community thinks. Others should take advantage of this opportunity," reveals 343 Industries' Ignacio J Guajardo.

Danny Mak, artist at Blind Squirrel and winner of Student of the Year in the Next-Gen Gaming category, is certainly proof online competitions get you noticed.



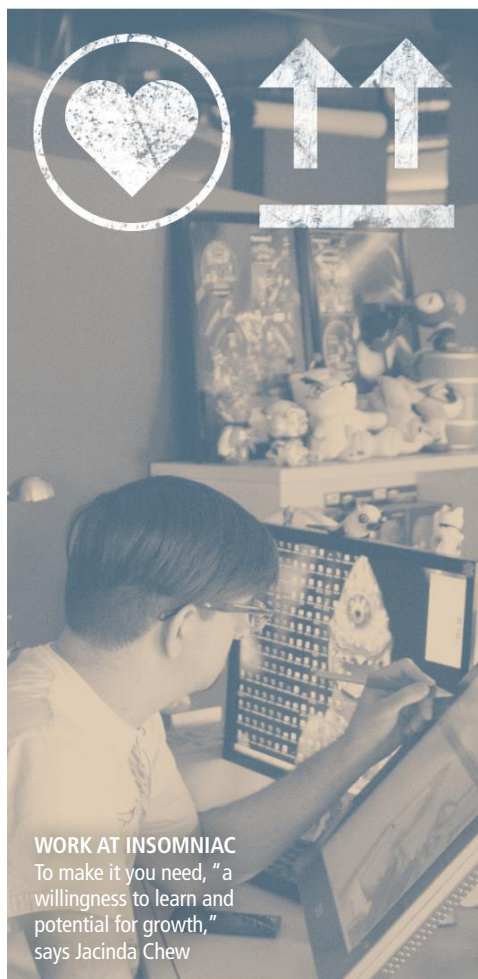
#### CHALLENGING WORK

"There are a lot more technical restrictions in the job... Your task is to make really good looking art that's efficient and works," says Ignacio J Guajardo



#### LOVE YOUR JOB

"I've always been fortunate enough to do what I love for work," says Dan Roarty



#### WORK AT INSOMNIAC

To make it you need, "a willingness to learn and potential for growth," says Jacinda Chew



*Danny Mak, artist, Blind Squirrel*



#### AWARD WINNER

Entering contests can help you get noticed, says Danny Mak



## SOFTWARE

*The essential design software to master*

- Maya/3ds Max
- Modo
- xNormal
- headus
- Substance Suite
- Quixel Suite 2
- Photoshop
- Marvelous Designer
- ZBrush
- Unreal Engine 4
- Unity 5



"A few companies reached out to me after winning," says Danny who urges others to enter: "Any press is good press. Especially in a field like this. If you're amazing but don't have your work where people can see it, no one will know about you. And if you're not there yet, at least you will know where you stand amongst your peers and how much further you have to go to meet your goals."

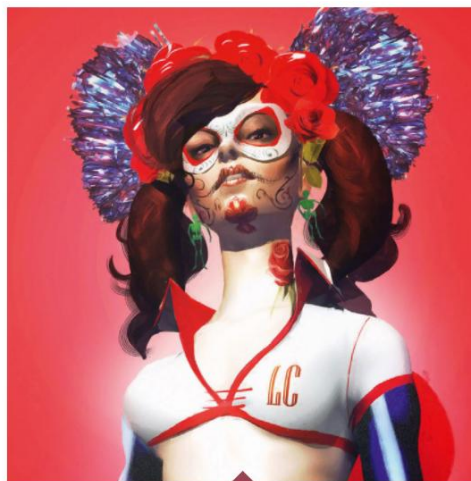
#### Get a website

Danny adds that posting online is like "being dropped into the wilderness and being told to survive," as your work will be compared to professionals also posting on CG websites. The advantage of a contest is you're being compared to your peers. Jacinda Chew,



## FEATURE

Power-up your career



## PORTFOLIO ADVICE

*Insomniac Games' art director Jacinda Chew offers her portfolio advice*

You need to understand that all art directors have been where you are, and they understand you're not going to have a bulging portfolio.

"If you're a new graduate, I don't expect that your portfolio will be as good as an industry veteran's so I look for two things: the first thing is a willingness to learn and the second thing is potential for growth," says Jacinda Chew.

Crucially, when looking at content, remember most companies are hiring you to be part of a team who must all work in a particular style and solve visual problems together.

"There is a style sweet spot that popular games fall into and it's important to keep track of industry trends. It's ok to experiment with different styles and subject matters, but make sure to show some marketable work as well if you want to attract a broader audience. This not only applies to those who want to work on the larger projects," Jacinda says.

However, this isn't the only thing to watch out for. "The other thing I see a lot in graduate portfolios is a lack of polish. Sculptures look low-poly, textures are obviously tiling, models are poorly lit and rendered, and character and environment designs are incomplete, to name a few. This is one thing you should learn in school, so make sure your work is complete and looks presentable in your portfolio."

With this in mind, is it better to target a portfolio or showreel at a particular studio/role than have a

general one? "I get asked this a lot. This depends on the studio you're applying to. If a studio has been doing the same type of projects for years, chances are they will continue to do the same thing moving forward," reveals Jacinda, adding: "In this case, I think it's important to target your portfolio to that particular studio."

"Insomniac tends to switch styles from project-to-project," continues the art director, "so I have the opposite problem where artists show me targeted portfolios of my last project when that is often exactly the opposite of what I'm looking for. I normally prefer to look at general portfolios for this reason."

So the simple answer is do your research and look for where the studio is going as much as where they've been. Another common question concerns showing work in progress examples (not unfinished random work) alongside final animations and renders...

"I get asked this a lot as well," explains Jacinda. "I feel a bit sorry that artists get so many conflicting responses to this question. Personally, I like seeing both in-progress images and final renders/animations. I'm not sure why it wouldn't be helpful to see in-progress work. If you think about it, most of the communication done between an art director and artist is via sketches and mock-ups. Of course I want to see it!"

art director at Insomniac Games, says she's



"always rummaging for work on portfolio sites... I spend a lot of time hand selecting and contacting artists for projects," but is a little more realistic about the success of online websites: "A lot of online artist communities and portfolio sites will showcase your work if you get enough clicks or likes on your work. This is highly dependent on how good your work is though! If you're not fortunate enough to be in that top 1 per cent, personal networking is probably way more effective."

That's right. It's not all online in the industry; putting yourself in front of employers remains a key way to get your foot in the door. Attend events and workshop days. For example, Cloud Imperium Games' art director Forrest Stephan managed to land his first job while attending GDC.



"There was a studio called Total Immersion Software, Inc. that needed an environment artist to create realistic buildings. Game development and game art was a hobby of mine, and I had previously worked on architectural environments, so it was a good fit."

A lucky encounter, but Forrest put himself out there for it to happen. The key is, what to do when you have that chance meeting? Only a small percentage of graduates will have work that is going to prompt someone to instantly hire them. Don't get disheartened if you're left scratching your head wondering what went wrong: "If you didn't get that instant job offer, make sure to



### Advice

It's ok to ask a portfolio reviewer or a company what they are looking for or what you can do better. If they were kind enough to reply, ask if you can follow up and show them your portfolio again. At worst, they say "no", but at best you might get a job with them in the future or gain enough insight to get a job elsewhere.

*Jacinda Chew*



**GETTING NOTICED**  
Want to land a job at Insomniac? Then get an online portfolio and attend classes and events





ask the reviewer what would make you a more desirable candidate,” says Jacinda, adding: “Ask them if you can present your work again when you improve your portfolio. Your willingness to improve and take feedback will get you noticed.”

Forrest agrees: “The game industry is a relatively small scene. Showing dedication adds a lot to one’s own character. Building a positive reputation will go a long way while climbing through your career path.”

## Make good contacts

So you didn’t get the job but you’ve made a contact and that’s key. Who you know can be vital to landing a future job. A referral can give you an advantage when competing against similarly skilled graduates. You don’t



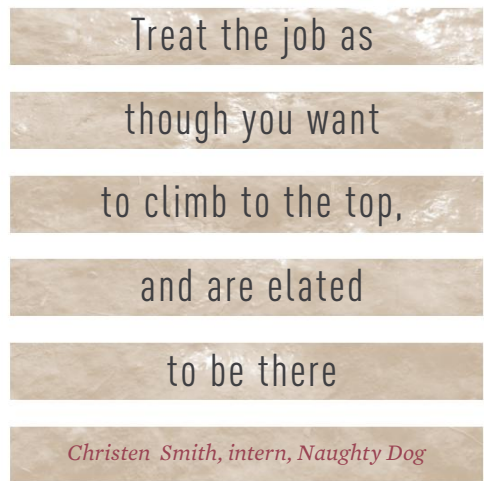
**KEEP IN TOUCH**  
Arno Schmitz advises to stay in contact with former classmates to make connections at different studios



## Advice

Look at every school assignment as a portfolio opportunity. Most assignments are designed to teach you only a specific skill and are not meant to be portfolio pieces. As long as it’s not at odds with the purpose of the assignment, consider putting in some extra work so you can use them to build up a portfolio more quickly. An easy way to do this is to spend extra time on each assignment after it’s handed in, to refine it and improve its presentation.

*Arno Schmitz*



*Christen Smith, intern, Naughty Dog*



to connect with people, almost everybody in the studio is on it,” says Arno.

## Learn on the job

A good internship is key. Environment artist Christen Smith is currently interning at Naughty Dog and says: “Treat the job as



though you want to climb to the top, and are elated to be there. Sell yourself as though they can’t afford to lose you. Do ask questions

whenever at all possible, do your best to meet your fellow teammates and interact with them socially, as they’ll become your best allies when you get stuck with something, or need help in general. Don’t be shy, and don’t pick an internship that isn’t a place that you would want to end up.”

need to rely on making new contacts at events either, those friends you’ve spent years with at college can help. “Keep in touch with your classmates. After graduation you’ll know people at different studios that way,” suggests Guerilla Games’ Arno Schmitz. “Today’s classmates are tomorrow’s contacts,” agrees Jacinda, adding: “Teachers also tend to know a lot of professionals and can be invaluable connections. Once you connect with these people, make sure to show them new work when you have it. This will keep you on their minds if anything comes up.”



If you get an internship at a company, talk to as many employees as you can and connect with them. “LinkedIn is a good way



**KEEP IMPROVING**  
“Better your skills and continue to learn beyond graduation,” says Cloud Imperium’s Forrest Stephan

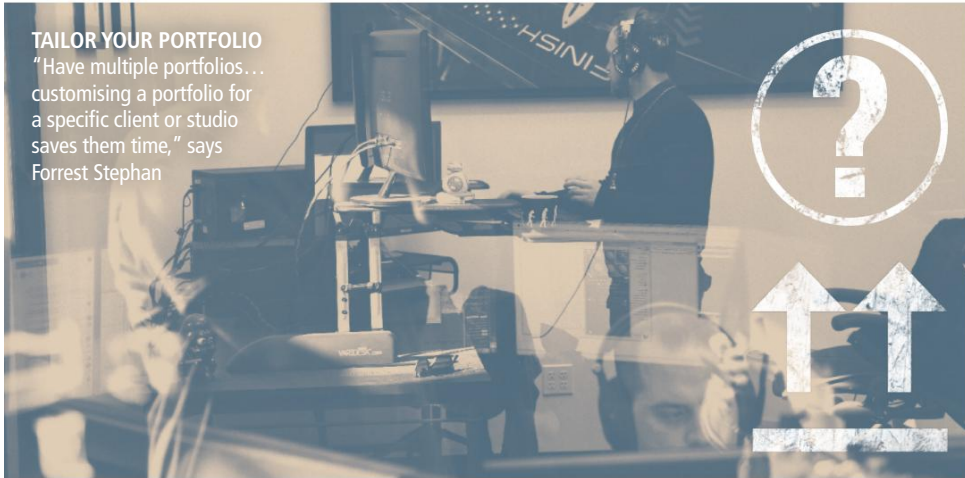


## FEATURE

Power-up your career

### TAILOR YOUR PORTFOLIO

"Have multiple portfolios... customising a portfolio for a specific client or studio saves them time," says Forrest Stephan



Forrest says communication is key when interning: "Take the opportunity to learn from the professionals around you. Any task, no matter how trivial, treat it as if it's of the utmost importance. Start building a reputation as being a hard worker that handles anything thrown your way."

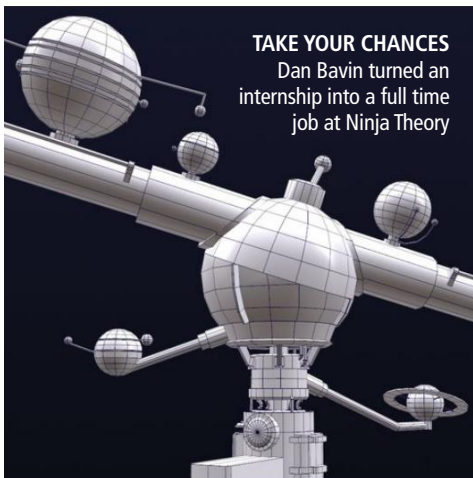
Danny's first experience of a professional studio revealed how much he still had to learn: "One of those things is to always keep up to date on the latest techniques and the latest programs. The industry is changing so rapidly that what I learned in school months ago is out of date. The industry, along with its tools, keeps evolving and we need to change along with it or we'll be left behind." Aside from software, the big learning curve when you first enter the workplace comes

Always keep up to date on  
the latest techniques and  
the latest programs... The  
industry keeps evolving and  
we need to change with it

*Danny Mak, artist, Blind Squirrel*

### TAKE YOUR CHANCES

Dan Bavin turned an internship into a full time job at Ninja Theory

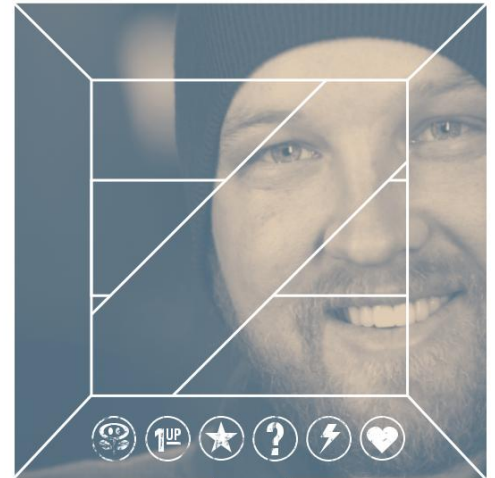


from your attitude to the job: you'll need to be positive, adaptable and committed.



"When I first got there [Ninja Theory] I realised I actually knew very little," says Dan Bavin, who won his placement through The CG Student Awards and has since been hired full-time. "Students that were top of the ladder in uni/college will find themselves at the bottom of the pile when they start working in a studio, but it's that notion that drives you to keep up with your more experienced colleagues. It gives you something to aim for, and constantly keeps you learning new things."

There are hurdles to jump through when making the move from education to workplace, including grasping new



## RIGHT MIND?

*Forrest Stephan reveals the key personality strengths to succeed in the game art industry*

### 1 STRENGTH IN NUMBERS

Two heads can be better than one, so welcome teamwork with fellow peers and drive each other's art work and techniques. Enjoy the people around you and working with such awesome talented individuals!

### 2 PROBLEM SOLVING

When things don't pan out exactly as planned, working through the challenges can avoid blockers. Problem solving can also help find methods of speeding up processes to help finish tasks on time, or better yet, ahead of schedule.

### 3 COMMITMENT TO WORK

Showing dedication adds a lot to one's own character. Building a positive reputation will go a long way while climbing through your career path.

### 4 BE SELF-MOTIVATED

Set personal goals to provide a drive to tackle any potential challenges ahead. One thing about game development is rarely do things work perfectly the first time, so always expect roadblocks and welcome the challenge.

### 5 BE PASSIONATE

A passionate attitude to work provides the enthusiasm to take art from good to great. We all want our artwork to shine and stand out from the crowd, so dedicate yourself to improving and developing.





pipelines. "There are a lot more technical restrictions in the job than in school," says Ignacio, revealing: "There's LODs, occluders, collision, and performance numbers to watch out for. I wouldn't go out of my way to learn too much of this because it could be more time spent becoming a better artist. It's just good to be aware that out of school, your task is to make really good looking art that is also efficient and works."

## Learn on the job

Likewise, Christen discovered Naughty Dog worked in ways he wasn't prepared for, "There's definitely a learning curve here, in the form of not only learning the Nova engine, but also naming conventions, proprietary tools they've built for shading,

texturing and modelling. Naughty Dog also has its own manner of doing things, so I've been learning that as well to add to my own workflow."

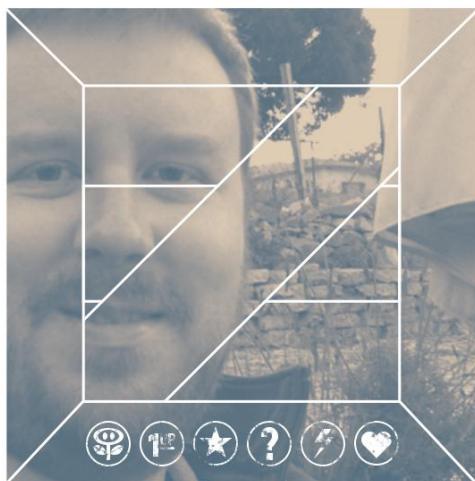
It may sound daunting, but those first day hurdles soon waver placed against the chance to learn from the best artists.

"On my first day I was a bit overwhelmed, due to Naughty Dog's massive reputation. A lot of rockstars work at ND, so it was a bit humbling," says Christen. "However, I soon realised what a tremendous opportunity this was to grow as an artist myself, learn a completely new arsenal of workflows and techniques, and network with some of the best artists in the business. I felt prepared for anything, and even still, had a new and steep learning curve ahead... I get to learn

## Advice

Being able to take feedback and criticism in good spirit is pretty important. You can't be precious about your work either. There's no telling when an asset you've been working on will turn out to be going in completely the wrong direction and needs changing. Maybe it'll be scrapped altogether, but that's just the nature of things.

**Dan Bavin**



### KEEP AN OPEN MIND

Be realistic, working in games is hard and the hours are long

## BE A SPECIALIST

*Infinity Ward's Josh Lynch reveals what it takes to make it as a pro environment artist*

There are several skills an environment artist needs for video games. For example, often you will be handed a basic blockout to be completed which requires you to build props, create materials, and handle the lighting for an area.

"The ability to build a functional environment that respects the intended gameplay for the area is foundational for everything going forward," says Josh, who adds you will also need traditional art skills to make the environment look good, "this is where being adept at modelling, texturing, and set dressing come into play."

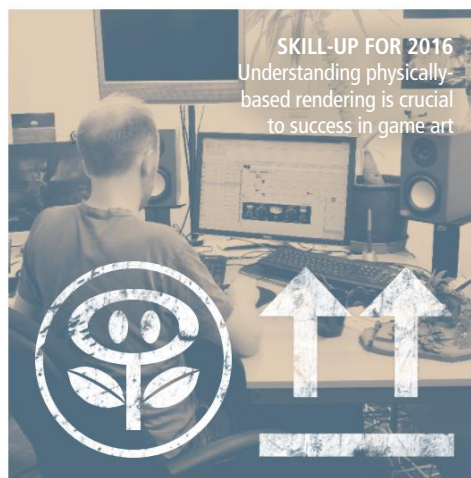
Finally you'll need the ability to work within a budget; limitations such as memory load and performance can affect assets. "Finding ways to make the right optimisations, without sacrificing the look of the environment, becomes very important. Understanding and working within those limitations goes a long way to being successful in this field," says Josh.

More specifically, you'll need to know your way around PBR textures. Josh suggests, "understanding how PBR shaders work along with studying the properties of real materials and how they react to light. It is also important to understand that each channel of the material has a unique role to play."



### INTERNSHIP 101

Christen Smith interned at Naughty Dog and advises to wait for the right studio



### SKILL-UP FOR 2016

Understanding physically-based rendering is crucial to success in game art

the on-the-job industry standard tricks from some of the best artists in the industry."

## Level up your skills

While there are things you'll need to learn on the job, many art directors are looking for key skills in 2016 from new graduates. For example, Forrest says he expects students to have hard surface modelling and organic sculpting skills as these are "valuable in the field."

You should also understand how lighting interacts with surfaces to show your knowledge of physically based rendering, "it's a knowledge base that comes in handy for modelling, texturing and lighting," says Forrest.

"Don't be afraid to try new software," he advises. "Most companies are open to



## FEATURE

### Power-up your career

introducing new applications or techniques to existing pipelines if it results in an increase in quality that saves both time and money."

When it comes to finding your role in the industry the key is to focus on your strengths and do what you love. For Arno it was always character design, "It takes a lot of hours outside of work/school to get good at any particular specialisation within game art, so if you don't absolutely love doing the work, you'll never put in the necessary hours."

Forrest agrees, advising to specialise in one thing but be the best you can at it: "In my career I've had the opportunity to work on characters, vehicles, environments, VFX, particles, lighting, composition and pipelines. I've welcomed them all as challenges and they've helped me become a better artist."



## NEW STARTER

Recent graduate **Omar Aweidah** has just started his career at **Cloud Imperium Games** and offers his insights into going pro...

### What advice would you give to readers embarking on an internship?

I interned with Blur Studios in Culver City. The most important thing for me was learning a professional pipeline and workflow. Since I was responsible for all aspects of my student work, working with a team was extremely valuable. I would suggest for anyone going into an internship to keep your mind open and learn as much as you can from all departments. It is a great opportunity to see how a studio works and how it functions.

### Was it a big learning curve going from school to a studio like Cloud Imperium Games?

The biggest learning curve was probably understanding the synergy of the studio. Everything is related to another part of production. If I changed something I believe to be simple, it may affect someone in another department significantly, and that could start a domino effect. Learning who to involve in the decision-making process is a great way to get things done quickly and efficiently.

### What has been the biggest challenge you've faced, and why?

The biggest challenge has been to stay motivated and inspired. Work can become rhythmic. It has been difficult for me to push myself to constantly get better. The best thing about working in a studio or a school is that you have people around you who you are inspired by, to help push you beyond what you assume you are capable of.

### Would you have done anything differently for your portfolio?

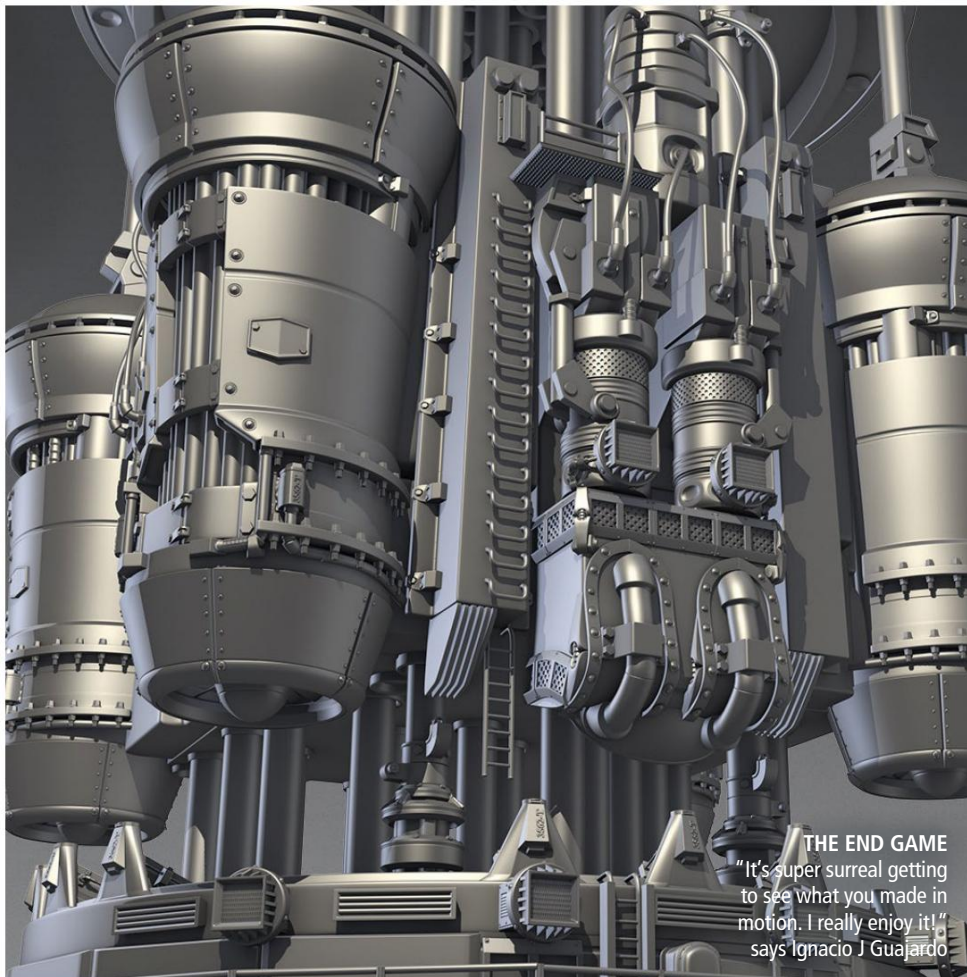
Yes, I would have attached more wireframes to my work. I wouldn't necessarily have attached them in my demo reel but I would've had them handy if anyone in an interview ever asked. I have had that happen before when I was asked for wireframes and did not have them handy. For production art it is really important to convey technical capabilities as well as artistic competence.

### What advice would you give anyone who wants to get into games art?

I would simply suggest to make art. The more you study art and practise it, the more valuable you are to making art for entertainment – especially games. The entire idea is to convey emotion and tell a story; if you can do this well with imagery, static or otherwise, you are an invaluable asset.

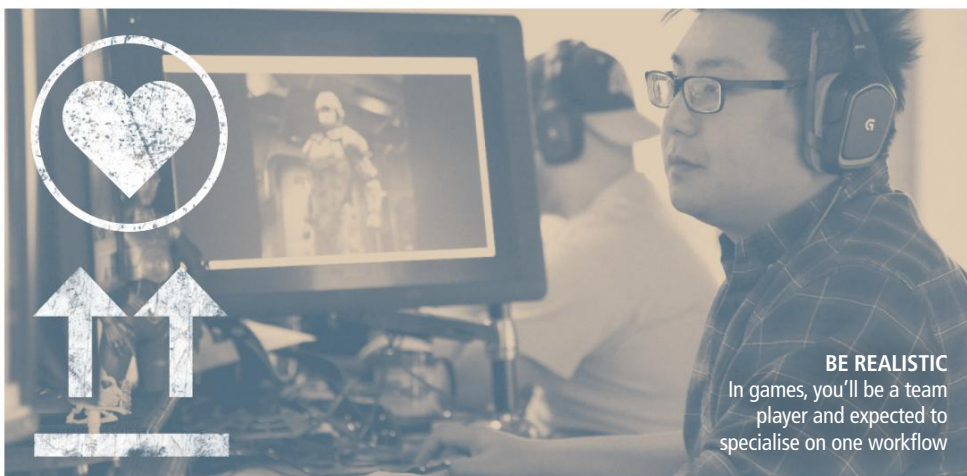
### What have you learned since working in the industry?

I have learned that 'impossible' is the worst thing anyone can say. We are constantly working on new techniques to do things. Sometimes they are not the smartest ideas, other times they work out well. Very rarely have I seen a team set out on an objective to create something and not find some way to creatively devise a solution. Just saying "we can't do that, it's impossible," is not an option.



### THE END GAME

"It's super surreal getting to see what you made in motion. I really enjoy it!" says Ignacio J Gualardo



### BE REALISTIC

In games, you'll be a team player and expected to specialise on one workflow



## Advice

I would simply suggest to make art. The more you study art and practise it, the more valuable you are to making art for entertainment – especially games. The entire idea is to convey emotion and tell a story; if you can do this well with imagery, static or otherwise, you are an invaluable asset.

*Omar Aweidah*



I started out as a 3D artist and found a consistent need to increase the quality and create more artwork in less time. To speed up my workflow I started writing basic scripts in 3D applications, which ultimately led to improving pipelines. Having more than one specialised field, in this case, environment artist and technical artist, allowed me to meet the deadlines and still ensure the art passed all quality checks."

## Know your role

The reality is you may find yourself filling in a role on a team as a specialist. If you want to develop in other areas you'll need to do it in your own time. In fact, all artists and art directors agree you need to be realistic about the industry. There are tough

Once [game art] becomes  
a profession, find  
something else you like  
to do and do that with  
some of your time off

*Omar Aweidah, Cloud Imperium Games*

deadlines, long hours and daily challenges. "There is a lot of passion that goes into making art for a game, so the hours stack up quickly. It's not uncommon for me to look out the window and discover it's dark outside and the day is already over and I feel like I just got started," reveals Forrester. "The deadlines approach rapidly and everything could be better so it's important to clearly define the scope, then balance the time, quality and cost." Cloud Imperium Games' Omar Aweidah agrees deadlines and long hours can pile up, and the struggle is to not let it take over your life, and find ways to deal with the workload: "Generally people involved in art for entertainment first view art as a hobby, then it becomes a profession. Once it becomes a profession,



## STAYING MOTIVATED

Working in a studio you're inspired by the people around you, which pushes you to create great work, says Omar Aweidah



find something else you like to do and do that with some of your time off. Having a balanced lifestyle is extremely important," he explains.

For Jacinda the real struggle isn't the work but a realisation that the industry has become crowded and a harder place for new talent to shine.

"The job market is really competitive, since the closures of VFX houses and game studios in the last few years have released a lot of industry vets into the job pool," she says. "I do feel like the industry is starting to recover a bit, especially with all of the excitement over VR recently. My guess is that more jobs will be opening up in 2016."

**FYI** Discover more CG career advice at [www.the.rookies.com](http://www.the.rookies.com)



INSPIRING  
CG ARTISTS

# 3D WORLD

**ARE YOU A CG  
PROFESSIONAL?  
GET OUR PRO PACK  
ON PAGE 59**

## SUBSCRIBE TO 3D WORLD

Whether you want 3D World delivered to your door, device, or both each month, we have three great options to choose from. Choose your subscription package today...

### PRINT

### DIGITAL

### PRINT & DIGITAL

**SAVE  
UP TO 54%**

Based on an annual  
subscription



UK

£55.00

£45.00

£66.00

EUROPE

€99.00

€60.00

€126.00

US

\$131.00

\$60.00

\$158.00

REST OF WORLD

\$140.00

\$60.00

\$167.00

## SUBSCRIBE TODAY

[www.myfavouritemagazines.co.uk/3dmag16](http://www.myfavouritemagazines.co.uk/3dmag16)

TERMS AND CONDITIONS Prices and savings quoted are compared to buying full priced print and digital issues. This offer is for new subscribers only. You will receive 13 issues in a year. If you are dissatisfied in any way you can write to us to cancel your subscription at any time and we will refund you for all unmailed issues. Prices correct at point of print and subject to change. For full terms and conditions please visit: [myfavm.ag/magterms](http://myfavm.ag/magterms). Offer ends 30/04/2016.





CONTENTS

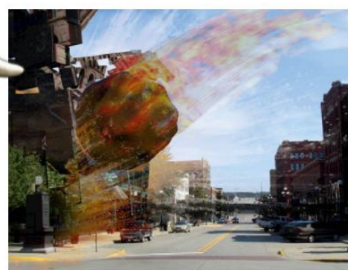
# TUTORIALS

Practical tips and tutorials from pro artists to improve your CG skills



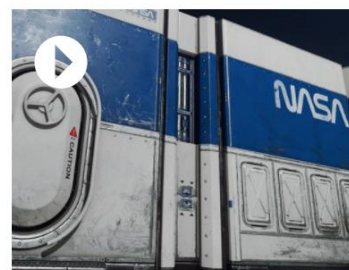
## 60 MASTER 3D CONCEPT ART

Learn the skills to design and model a concept vehicle for video game production



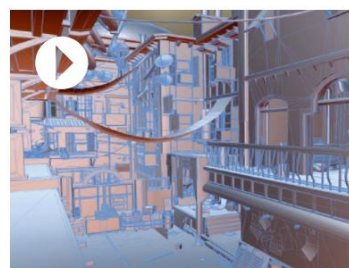
## 66 SIMULATE AN EXPLOSION

How to use C4D's Projection Man tool



## 68 CREATE A TEXTURE SET

Multi-purpose tiling textures for games



## 80 MODELLING GAME PROPS

How to improve your speed and workflow

## 52 CHARACTER CREATION

Model and rig a game-ready character



## 72 IMPROVE YOUR SCULPTING

Understanding human anatomy



## 76 GET STARTED IN STINGRAY

Harness the tools of this new game engine

FOR MORE ON YOUR  
**FREE DOWNLOADS  
& VIDEO TRAINING**  
TURN TO PAGE 6

## GET YOUR RESOURCES

You're three steps away from this issue's video training and files...

### 1. GO TO THE WEBSITE

Type this into your browser's address bar:  
[www.creativebloq.com/vault/3dw206](http://www.creativebloq.com/vault/3dw206)

### 2. FIND THE FILES YOU WANT

Search the list of free resources to find the video and files you want.

### 3. DOWNLOAD WHAT YOU NEED

Click the Download buttons and your files will save to your PC or Mac.





**ZBRUSH | MODO | MAYA | MARI | PHOTOSHOP | XNORMAL**

# MODEL AND RIG A GAME CHARACTER

*Ben Erdt and Perry Leijten* share their workflow to create a fan art character inspired by the creatures from Unreal Tournament



## ARTIST PROFILE

### Ben Erdt

Ben is a professional character/creature artist and modeller who is currently working at Guerrilla Games.

[www.ben-erdt.de](http://www.ben-erdt.de)



## ARTIST PROFILE

### Perry Leijten

Perry is a technical artist currently working at Guerrilla Games. He started out as an all-round artist but later found his passion in rigging and scripting.

[www.perryleijten.com](http://www.perryleijten.com)

**A**s a huge fan of Epic's Unreal Tournament and its universe, I was keen to explore modelling the fearsome Skaarj for this tutorial project.

From the very first brush strokes in ZBrush to the final rendered image, the following step-by-step breakdown will give you an insight into how this game-ready character was made. You will learn about how ZBrush was used to sculpt the highly detailed body, about the workflow and tools to model the high-poly armour and the final rendermesh inside of Modo.

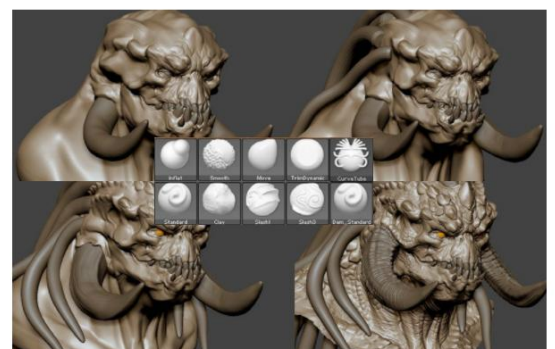
In the accompanying video, which can be downloaded from this issue's online Vault, I also show you how to use simple macros to make the Modo polygon modelling less click intensive, therefore speeding up your workflow.

I will also share the way I use Marvelous Designer to create the pants and pouch for the character. The tutorial will describe the use of Mari to paint the skin texture as well as how Quixel Suite served as a detail generator for the final armour texture creation inside

of Photoshop. My colleague and friend Perry Leijten will take over to share his process for rigging my model for games, including three videos of his process, before I take the project back to show you the passes I render in order to gain full control over the final composition.

To help you further explore our Skaarj project, you can find the complete Maya file with the rigged models as well as my textures in the online Vault.

 For all the assets you need go to [creativebloq.com/vault/3dw206](http://creativebloq.com/vault/3dw206)



## 1 GATHERING REFERENCES

I can still remember the first encounter with the Skaarj in Epic Games' Unreal from 1998 when you were stuck in a corridor, the lights went out and he attacked you out of the dark. The news about them being back in Unreal Tournament 4 got me very excited. So I wanted to create a fan art character inspired by those creature dudes. To help me get started, I first collect some reference images. I also play parts of the game again to get inspired by the way they behave and attack.

## 2 SCULPTING THE HEAD

I start with a simple sphere and turn it into DynaMesh geometry. Using a small set of stock brushes such as the Move, Clay Tubes, Standard, Dam\_Standard and Smooth brush, I block out the basic forms and features of the head. The dreads and tusks are being added as separate subtools. For the dreads I use a brush called Insert Curve Tube brush. The eyes are spheres added separately and positioned with the Transpose tool.

## TOPICS COVERED

- ▶ Concept design
- ▶ Model high-poly armour
- ▶ Textures in Mari and Quixel
- ▶ Model rigging
- ▶ Render settings



# FEARSOME SKAARJ

Ben was excited to explore modelling the Unreal Tournament character, first seen in 1998





## TUTORIALS

Create a fan art character

PREPARE FOR  
ZREMESH

### CREATE ZREMESH WITH SUBTOOLS



#### ONE MERGE AND DUPLICATE SUBTOOLS

The separately sculpted head and body (A) are being merged together into a new tool (B). There is now one tool but still separate objects of geometry.



#### TWO RE-DYNAMESH TARGET GEOMETRY

The combined tool is duplicated on top of the original (C) and converted into a new DynaMesh (D). Set DynaMesh Resolution high enough to retain most of the original detail.



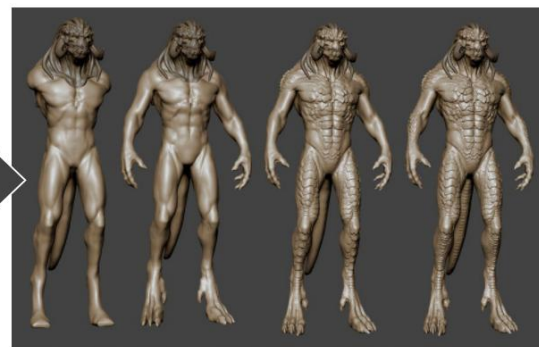
#### THREE ZREMESH AND PROJECTING DETAIL

Use Curve Guide Brush for cleaner ZRemesh geo. Use ProjectAll on each Subd level to project detail from the original sculpt to the new geometry (E). Final detail (F).

#### EXPERT TIP

##### Retopology in Modo

As snapping behaviour is not a global but a per-tool setting, you can quickly use standard modelling tools parallel to Retopology, which really speeds up the workflow.



### 3 SCULPTING THE BODY

Once I am happy with the overall head design I start sculpting the rest of the body. I add another sphere primitive as a separate subtool and convert it into DynaMesh geometry. By using the same standard brushes, such as the Standard, Move, Clay Tube, Dam\_Standard, I block out the basic shapes and forms to define the overall silhouette. I extrude the arms, fingers, legs and tail by masking the appropriate area, inverting the mask and using the Transpose tool.



### 4 USING THE ZREMESH

For denser sculpting geometry and to change Subd levels I convert the character mesh to ZRemesh geometry. First, I merge both the head and body into one subtool and duplicate it to have one as a projection source. After ZRemesh I project the detail back from the original subtool. I do this for every subdivision level of the new geo. For each Subd I check the mesh for projection artifacts and clean them before moving on to the next.

### 5 SKIN DETAIL PASS

To draw the big scales and to create their overlapping effect I use the Slash 1 brush. The Clay brush is great for adding more thickness to the scales and to make them look like they grow out of the skin. To blend the large scales into each other and to make them fade into the rest of the skin, I use some custom scale alphas and a set of brushes such as Clay, Standard and Dam\_Standard.

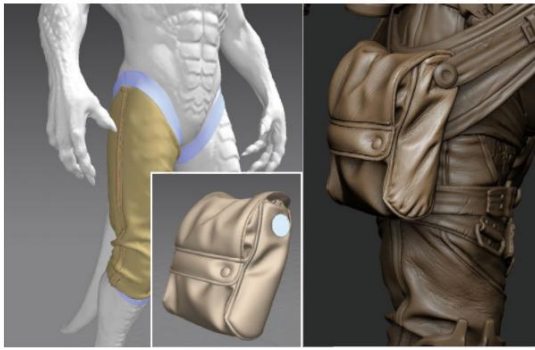


### 6 SKETCH AND MODEL ARMOUR

A paint over of a screenshot serves as the starting point for the armour. I import the body into Modo and start modelling the main features. All parts are being modelled using simple Subd modelling techniques with the standard set of modelling tools (Bevel, Add Loop, Add Point, Transform, Edge Slice, and Element Move). In some cases I use the Retopology tools along with the Background Constraints. Its snapping behaviour is useful when getting started with new geo.







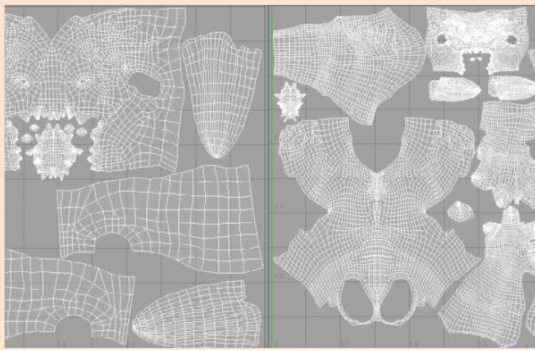
## 7 IN MARVELOUS DESIGNER

In order to give the cloth folds and wrinkles of the pants and pouch a more realistic look, I create them in Marvelous Designer. It takes a bit of tweaking and hacking to get the desired results in Marvelous Designer. Being able to use the Freeze Pattern function in MD makes the workflow less destructive. I use that feature all the time. Back in ZBrush I then sculpt another detail pass for a better leather material expression.



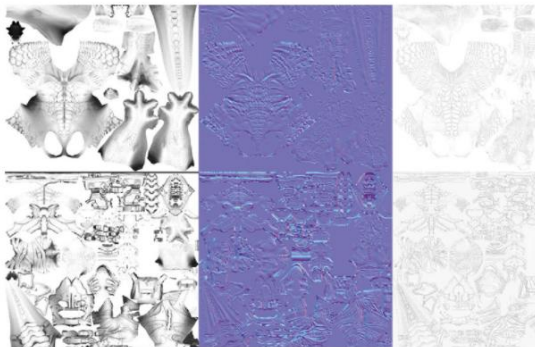
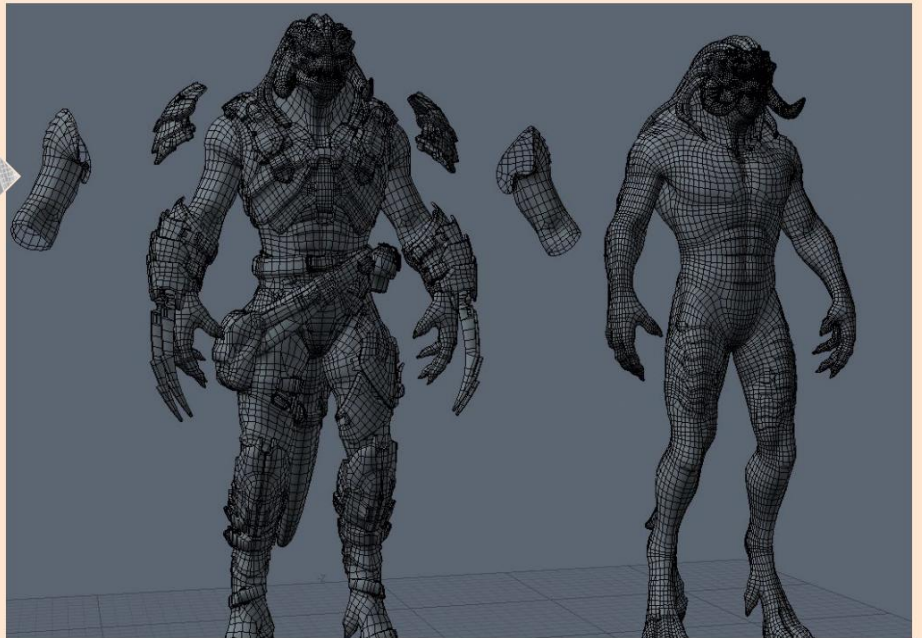
## 8 MODEL THE RENDERMESH

The final rendermesh for the character is supposed to be more modular, in order to create a few variations. I also create a rendermesh for the naked body. That way I can always build a new type of armour on top in the future. After importing and preparing all high-poly parts into Modo, I mostly use the Topology Pen along with standard modelling techniques. According to the later variations, I keep specific parts as separate pieces.



## 9 CREATING UVS

I keep the naked body as one separate UV shell and texture. The armoured version, including the two different upper arm variations, also get their own UVs. The head stays separate as well. Inside Modo I select the edges which are going to be the UV seams and use the Unwrap tool. I can also select a set of faces and Modo will unwrap that selection. Along with the Unwrap and Relax tool, I create the UVs for each piece of geo.



## 10 BAKING TEXTURE MAPS

Next to the standard maps such as Normal, AO and Material ID, I always bake additional types of textures like Object Space Normals, Displacement, Cavity, Convexity and so forth – that can be useful for later texturing. As the naked body will be textured entirely in Mari, those baked textures will come in handy to have more control to create nice skin variations and patterns. For characters like this one with reptile skin, Cavity maps are excellent to work with.



### EXPERT TIP

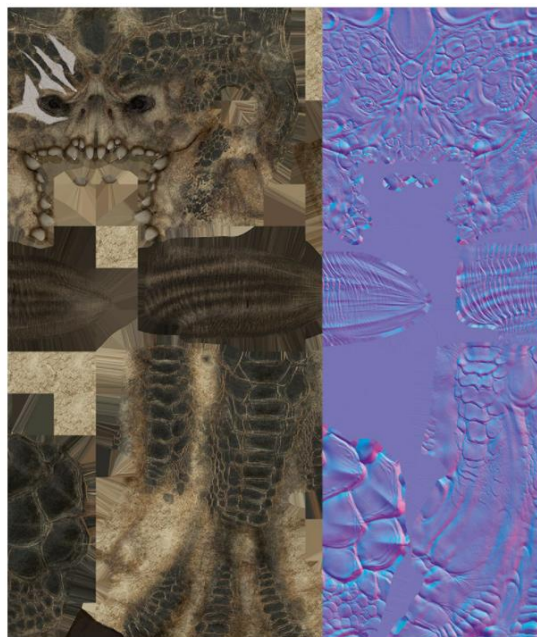
#### Using masks for texturing

Whenever working with colours, for example basic colours for skin, use masks of the appropriate colour layer. That way you can always go back and do colour changes if necessary.



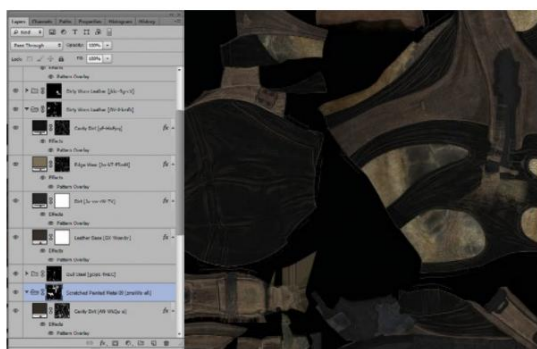
**EXPERT TIP****Investing time  
in rendering**

Invest some extra time in getting the Master Beauty pass right. Trying to fix render artefacts or bad lighting during compositing can be quite tedious and negatively alter the image.

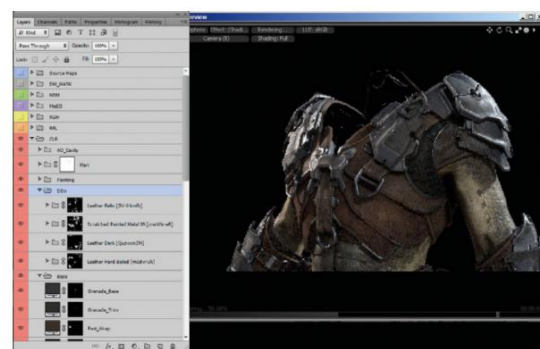
**11 BODY TEXTURE IN MARI**

After importing the body mesh, I start with very basic colour tones that I pick from reptile reference images. To break these colours and to make the basic skin look high-res I blend over a layer with a tileable texture. Using the previously baked AO, Displacement, and Cavity maps, I create masks in Photoshop to make texturing the scales easier in Mari. For more surface detail on the scales I add more procedural layers in Mari with tileable textures.

I pick a Smart Material  
preset that fits the  
desired target material  
for the particular surface

**12 USING QUIXEL DDO**

I mainly use Quixel Suite to generate the detail I need for the appropriate material such as worn out edges, scratches, and areas of dust and dirt accumulation. Mesh, Normal, AO and Object Space Normal are being imported into Quixel. I pick a Smart Material preset that fits the desired target material for the particular surface. Once applied, I tweak the masking and detail patterns to make the detail more interesting.

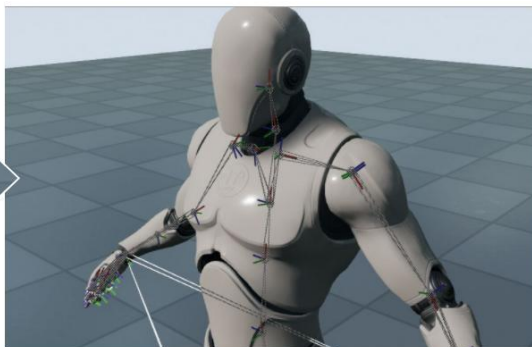
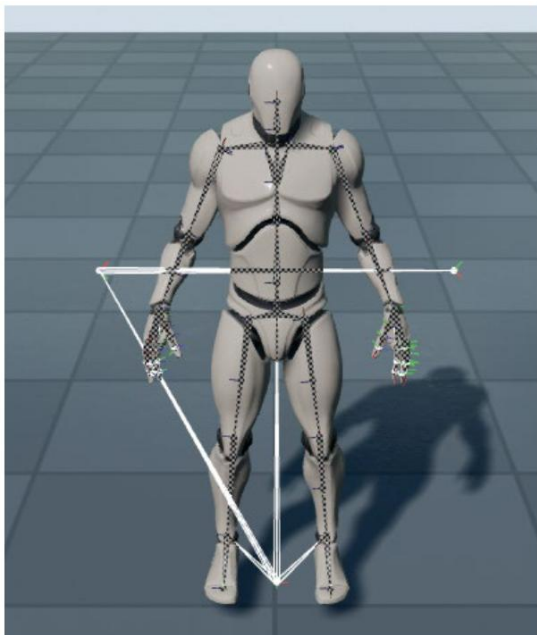
**13 TEXTURES AND SHADERS**

I copy the detail layers from the Quixel PSD into my PSD master file, which contains the final texture maps (Albedo, Reflection, Roughness) as colour-coded groups. Next to basic colours, the dDo layers and Mari additions, I make final handpainted tweaks and photo manipulations. I check my renders and finish creating texture maps. Modo shaders are simple; they've got the basic material set to the Modo PBR and texture maps on top with their appropriate effects on the shader.

**14 RENDER AND COMPOSITION**

For the final scene I mostly use area lights for the classic three-point light setup (Key, Fill and Rim). I then add additional lights to sculpt out more of the character's shapes and silhouette. I always render different passes of a scene to have full control over the composition later on. Some of these passes are RGB Lights, Depth, AO, Cavity, World Space Normals, Specular, Reflection, Surface Masks and Depth. Now it's over to Perry to rig this beast...





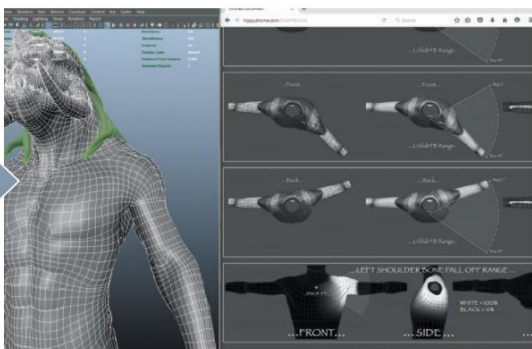
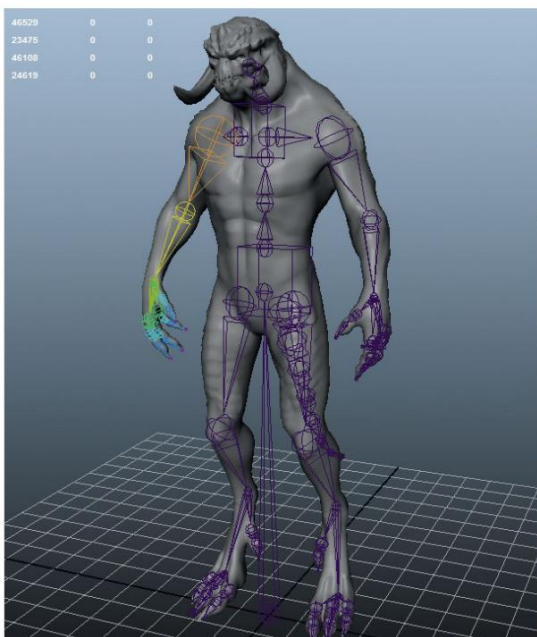
## EXPERT TIP

### All about topology

The skinning process can be very tedious, and most of the time bad topology is to blame. Helping out the modeller also helps you.

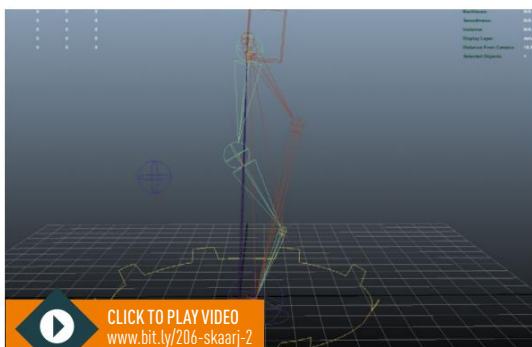
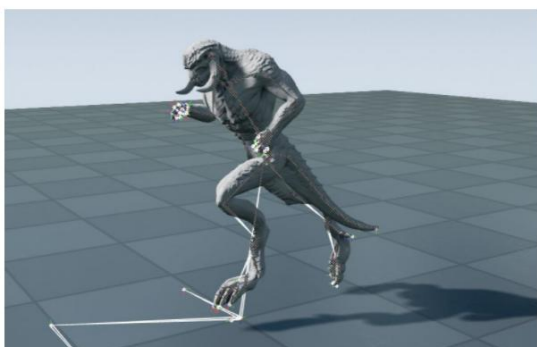
## 15 RIGGING RESEARCH

Before you start rigging, start figuring out the naming convention of the bones and axis preferences. In this case the naming convention is predefined for humanoid rigs, so that is the convention you need to uphold (although Unreal 4 is flexible in this, keeping the naming convention as is helps with retargeting later). The Unreal documents also specify that adding joint chains to a humanoid character is possible as long as it doesn't interfere with the original hierarchy.



## 16 GET THE MODEL EARLY

Getting the model as soon as possible is key; bone placement and testing can start with a rough model. Also, you can check for possible bottlenecks in deformation and topology, and be sure to discuss problems and possible solutions with the modeller. After setting up the bone placement it's best to check out if the engine is capable of running the mesh. Just bind the mesh to the skeleton (no need for weight painting), then export and check it in the engine.



## 17 RETARGETING

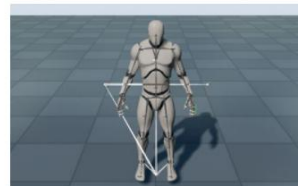
The nice thing about working in Unreal is that it has a lot of tools that can make your life easy when checking the bound mesh. If you use the Unreal naming convention and joint axis orientation (specified in step 15) setting up the retargeting system is easy. Link two characters together and specify which animation you want to convert. Most engines won't have this luxury but testing as much as possible will really help out in the long run.

## 18 THINK IN COMPONENTS

Now you know that the skeleton is going to work in the engine, we can start having fun creating the rig. While the modeller is finishing up the model, textures, and so forth, you can use this time to test several possibilities for how the rig would look in the end. Start with basic components: leg, arm, body or head. This time to test allows you to figure out what could be automated and what should be controlled by the animator.

POWER OF  
UNREAL

## RETARGET TO PROVE THE SKELETON WORKS



### ONE SETTING UP THE MANNEQUIN

Search for the UE4\_mannequin skeleton and double click to open a new window. Click the Retarget Manager, select the humanoid rig, and position the arms to match the pose of your character.



### TWO SETTING UP THE SKAARJ

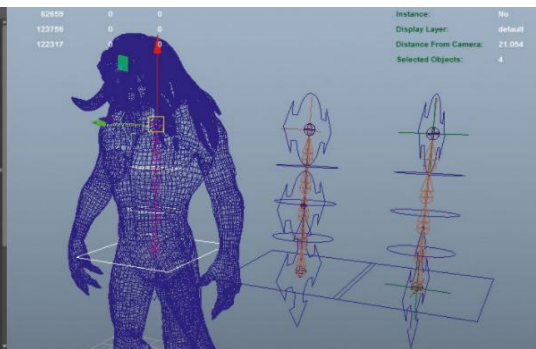
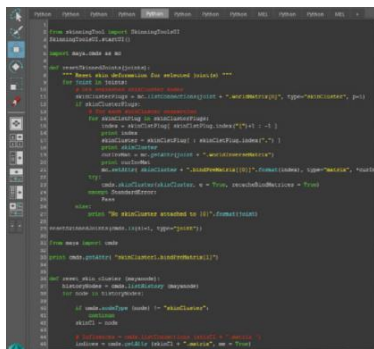
Import the character with skeleton and open the Retarget Manager. In the Retarget Manager, select the humanoid rig. Match the names of the humanoid bones with the skaarj (this should be the same).



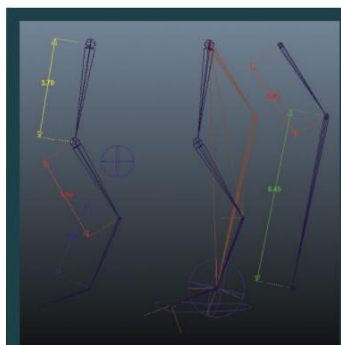
### THREE TEST ANIMATION

Locate any animation file that uses the UE4\_mannequin. Right-click and go to Retarget Anim Assets>Duplicate Anim Assets>Retarget. Select your character and the animation will be retargeted.





CLICK TO PLAY VIDEO  
www.bit.ly/206-skaarj-3



## LEG COMPONENT

Use two bones to drive three

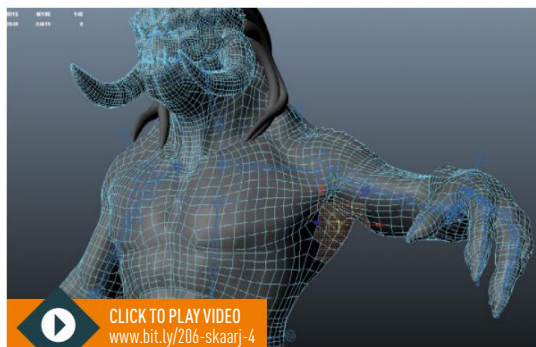
Video one explains how to create a two bone IK system that drives the hind leg (normally part of a canine or feline creature). The behaviour of a hind leg works in such a way that the upper part and the lower part of the leg stay parallel when walking. This system makes use of that knowledge as the resulting behaviour is similar to a spring-IK system but still gives an animator the control to change the orientation of the lower leg. In this way the ankle control serves as an extended reverse foot control. The ankle control is oriented using the two-bone chain, making sure that the lower leg stays parallel when untouched.

## 19 CREATE PYTHON SCRIPTS

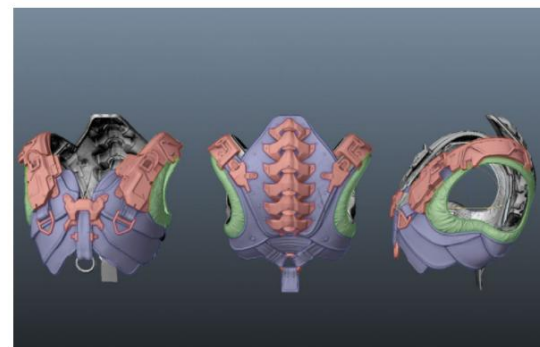
During the testing phase it's helpful to write a script based off the components that worked well. This way you can easily recreate the part of the rig and also test it out on some more extreme cases, which will help if you encounter similar rig-component on other projects, and to make sure that the animator cannot break the rig. Scripting also helps identify problems early on and it gives me new ideas on how to expand on the component.

## 20 PLUG-INS OR NODES

Sometimes you cannot solve everything using only Maya nodes and extra plug-ins might be necessary. A lot of plug-ins are available on the internet, but some you might have to create yourself. For this creature a C++ plug-in is created to calculate the correct rotation of the shoulder based on a quaternion formula, using the Matrix information from the shoulder bone. A similar effect can be created with an IK-Handle, shown in video two.



CLICK TO PLAY VIDEO  
www.bit.ly/206-skaarj-4



## 21 SKINNING

I created my own skinning tools ([www.creativecrash.com/maya/script/skinning-tool](http://www.creativecrash.com/maya/script/skinning-tool)) which allowed me to start finalising the skin weights on the mock-up mesh. The tools are explained in video three. In this case we have a naked version of the Skaarj, which is where I start from. Make sure that this model is skinned properly as it will serve as a base for the other pieces.

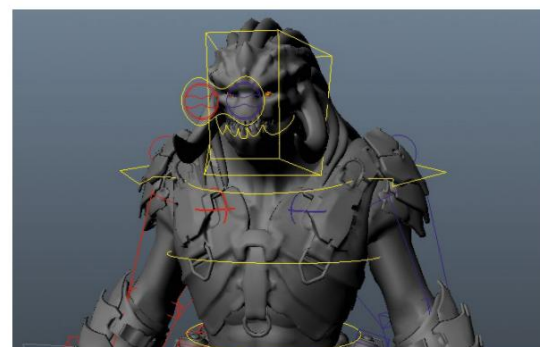
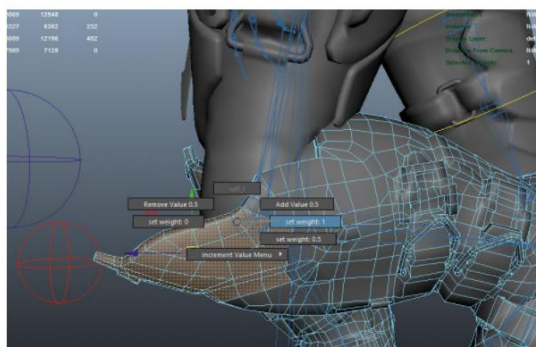
## 22 RESEARCH SURFACE DETAILS

When all armour parts are in, try to identify all the details; flesh, leather, metal and so forth, and decide on how you want the model to behave around these parts. Sometimes a model can cause problems in motion, so talk to the modeller on how he expected the mesh to deform there and what might be the best alternative you can provide. Sometimes you need to bend metal parts in motion, but it's best to prevent/hide this so it doesn't become obvious.

### EXPERT TIP

Use joint labels

Give the joints correct labels; skinning options are able to search for these and will give better results when used – even when joints are placed at the same spot.



## 23 CLEAN SKINNING PROCESS

When the mesh is finalised and all pieces are created, the skinning can be finalised as well. Use the base that is skinned to copy over the skinning information. The identified materials in parts of the mesh also need to be taken into account. Extra detail that is added in the model, which might need to be rigged, can be fixed and added in this phase as well. Make sure to skin perfectly, as it's the only thing people will notice!

## 24 FINALISE

When the project comes to an end, it's best to go over the final product together with the modeller. Check if everything is as the modeller envisioned. Sometimes small errors can be spotted by a fresh pair of eyes. Make sure that the outline is clean and everything is put into correct layers. Hide and/or lock the layers which are not necessary for an animator. Video three gives an overview on skinning the parts. ■



# 3D WORLD PRO



## YOU ARE INVITED TO JOIN 3D WORLD PRO

**PRO  
BUNDLE  
WORTH  
£371**

From students to Oscar-winners, CG artists and animators from all over the world rate our magazine, so we've taken it one step further to offer you 3D World Pro.

Join 3D World Pro and as a special introductory offer, you can save £30!

### WHAT YOU'LL GET

- 13 issues of 3D World in print and digital
- Annual Industry Report worth £100
- A design handbook worth £9.99
- Discounts to industry events
- Special discounts from selected partners (including LightWave and iClone)
- Monthly 3D World Pro email newsletter

**ALL THIS FROM JUST ~~£135~~ £105**

**JOIN TODAY VISIT...**

**[www.myfavouritemagazines.co.uk/3dworldpro](http://www.myfavouritemagazines.co.uk/3dworldpro)**

TERMS AND CONDITIONS Pricing and savings quoted are compared to buying full priced UK print and digital issues. You'll receive 13 issues in a year. Prices correct at point of print and subject to change. Full terms and conditions myfavm\_ag/magterms. Offer ends 31st March 2016.





MAYA | KEYSHOT | PHOTOSHOP

# MASTER 3D CONCEPT ART

*Gurmukh Bhasin* shares his insights into creating a SWAT special rescue vehicle for video game production



## ARTIST PROFILE

**Gurmukh Bhasin**

Gurmukh is an architectural designer turned 3D concept artist who works for Cloud Imperium Games. He teaches classes at [conceptartworkshop.com](http://conceptartworkshop.com) and enjoys creating surreal and unearthly environments, architecture, vehicles, and props for games. [gurmukhbhasin.com](http://gurmukhbhasin.com)

For the past 18 months I have been working as a 3D concept artist at Cloud Imperium Games in Los Angeles on the video game *Star Citizen*. Designing spaceships for a living is a dream come true, but my portfolio is starting to get a little spaceship heavy.

When the opportunity came along to do an article for 3D World magazine, I decided to challenge myself to create something different. Right away I decided that I wanted to create a near future SWAT special rescue vehicle as I thought it would be fun to design something with wheels.

I knew my deadline would be tough to meet with

working a lot and teaching at [conceptartworkshop.com](http://conceptartworkshop.com), so I decided to cheat a little and use parts of a HEMTT-M1075 truck I modelled back in 2013. I knew that I could borrow the frame, gas tanks, parts for the wheels and a few more pieces from this model as a faster starting point than beginning with nothing and designing a whole new truck. When working in concept design, speed is vital and having a library of past projects and models to dip into, reuse and adapt is an important lesson to learn.

In this tutorial we'll be looking at designing a vehicle that can fit into a video game pipeline. I'll be sharing my process, thoughts and

ideas as we go. This is the same workflow I use to create designs for Cloud Imperium Games and I hope you pick up some new techniques along the way.

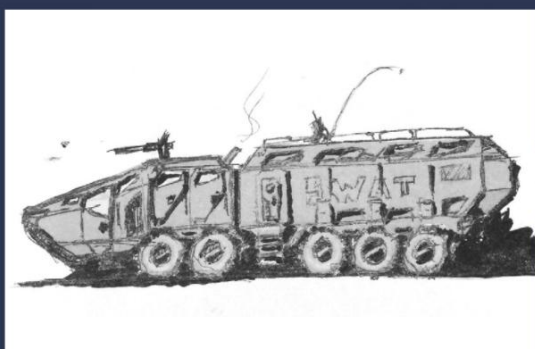
This project was a lot of fun to create, especially since it is something different to a spaceship. I really hope that those of you who read this article can see how easy it is to design something in 3D, and if you keep it simple, you can play and adjust your design early on, and then slowly layer up the details as you move along until it is a complete design. Hopefully it will inspire you to create your own designs!

For all the assets you need go to [creativebloq.com/vault/3dw206](http://creativebloq.com/vault/3dw206)



## UTILISE PAST WORK

When working in concept design it's good to have a library of past models and projects to reuse and adapt



## 1 START WITH A SKETCH

After deciding what type of vehicle I wanted to create, and gathering my old truck model as a starting block, I set a few rules to the design to make it unique and interesting. At work, I design vehicles that are about 1,000 years in the future, so I decide I want to create something that is maybe five to ten years in the future. I know I want to make something that is asymmetrical and different, too. I quickly gather reference images

of SWAT trucks and military vehicles. I really like the shapes of the amphibious trucks used in the military that can go in water and drive on land. The hard angles and distinct look of those trucks spark ideas in my head so I grab my brush pen and sketchbook and throw a few ideas down on paper. I like to begin with 2D sketches, but the references are the vital element; keep them to hand to ensure your design remains believable.

## EXPERT TIP

### Keep an assets library

Speed up the 3D concept process by using old model parts. Save every new wheel design or bolt model as its own file in a well organised library, so it's ready to import.

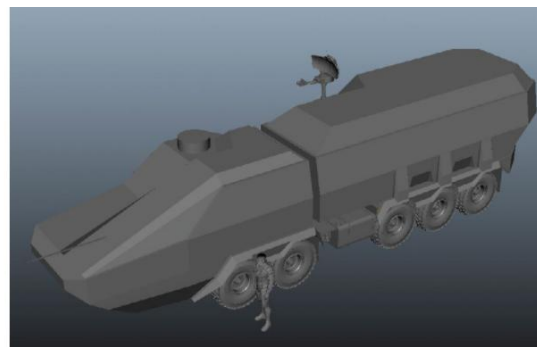
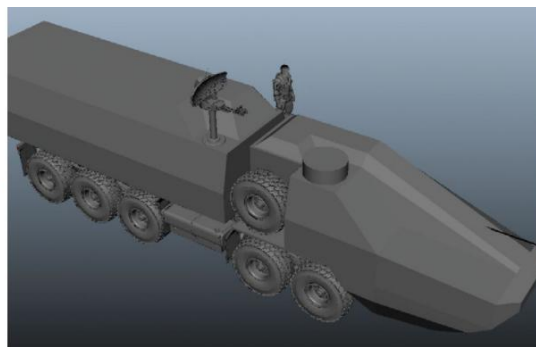
## TOPICS COVERED

- Concept design
- Modelling
- Revisions
- Compositing



**USE REFERENCES**

Constantly use reference images to help you understand what needs to go into a truck like this, and always work with your model in the simplest way

**2 JUMP INTO MAYA**

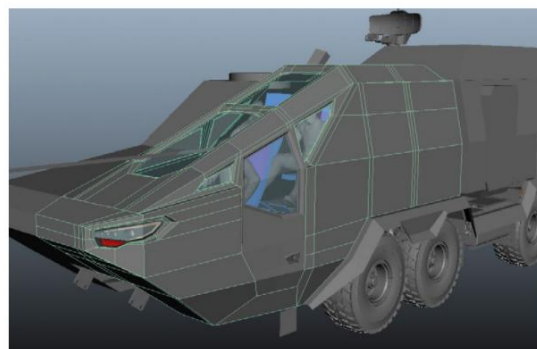
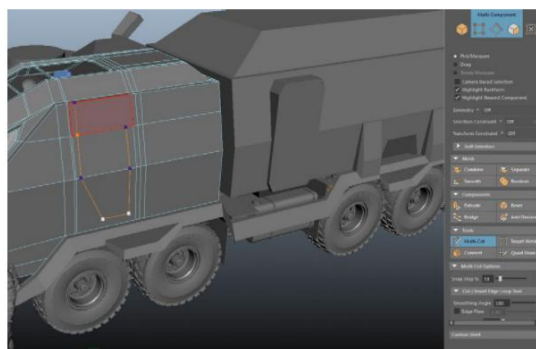
Next I jump into Maya and play around with simple shapes to test out my ideas. This part is always a lot of fun for me because I am starting to see the things in my head come to life. Usually what I am thinking at first doesn't work out the way I imagined it would, but it's always a starting point that leads to new ideas once I see my original ideas fail in 3D.

**3 START WITH BIG SHAPES**

This time my original idea seems to work pretty well and my design stays quite consistent throughout the project. Starting with simple shapes to get the overall mass of the design in 3D is really helpful as it's very easy to change and look at from all angles. When creating concept designs, such as this for a video game, always work big and reduce the shapes to keep the idea consistent and focused.

**USE A SCALE FIGURE**

Ensure the openings you're cutting are the correct height and width; place a scale figure in the scene so you know it fits through the door and would be able to see out of the windows

**4 DRAW AND CUT SHAPES**

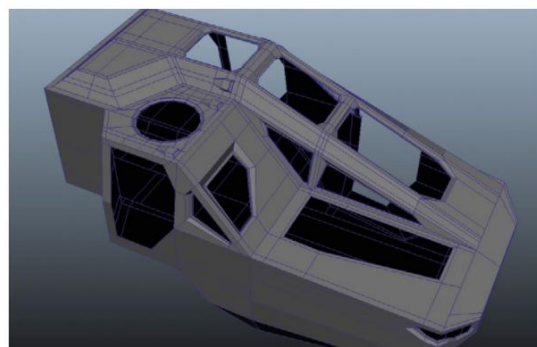
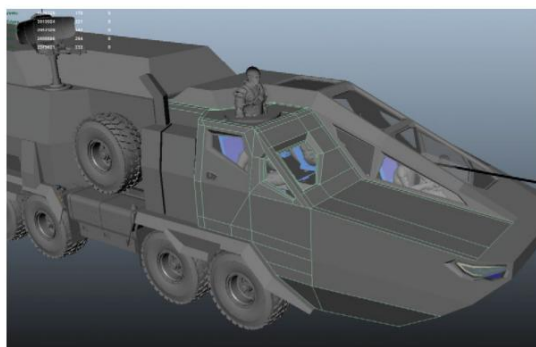
I'm happy with my basic shapes, so I start cutting into them to add window and door openings. I use the Multi Cut tool in Maya and draw the shapes I want to cut out with edges. I always try to keep my model as clean as possible as it makes things easier; but at this point I am not worried about ngons or keeping things as quads. Right now it's all about getting the right shapes into the design – I will clean it up later.

**5 KEEP USING REFERENCES**

I continue cutting into my basic shapes and adding interesting things to my design. I look at my references for inspiration and then recreate things I like. The shapes for the headlights were inspired by one of the amphibious truck reference images I had found. I don't add supporting edges for subdivisions yet as they will make changing the design too complicated. I keep things as simple as possible so I have the most freedom to change the things I am working on.

**KEEP IT TO SCALE****Use realistic measurements**

One of the many benefits of working as an architect before switching my career to concept design, is I am used to designing things to real world dimensions and I always use this knowledge when designing fictional things, like spaceships (and SWAT trucks). I find that when you are able to relate your design to the human scale, you are selling the idea that this thing could be real and it makes it a lot more enjoyable for people to believe in, or dream about your creation.

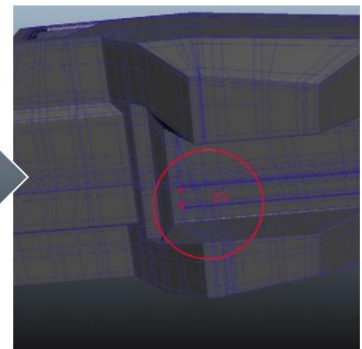
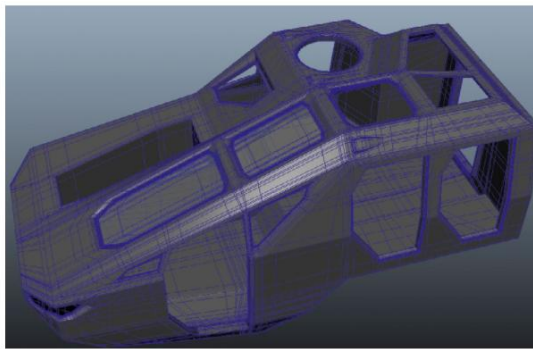
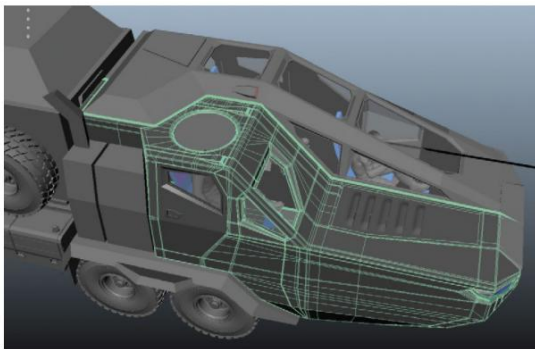
**6 WORK LOGICALLY**

Since this truck is an asymmetrical design, I make sure to keep both sides separate and work on them individually. Later I will ensure all my edges line up so I can connect the two parts. For now I just focus on one side at a time, trying to keep everything simple and easy to handle. I also make sure to put scale figures in my design as early as possible so I know all my openings and parts are the correct dimensions.

**7 KEEP IT SIMPLE**

I continue to work through the design, adding all the parts I see necessary in the simplest way. It's important to not overly complicate things in the early stages. If you try to focus and detail one part too early, you will become locked into your design and unable to adjust things. The purpose of concept design is to be able to change elements that aren't working, so keeping things as simple as you can early on is very important for that process.





## 8 CLEANING UP THE MODEL

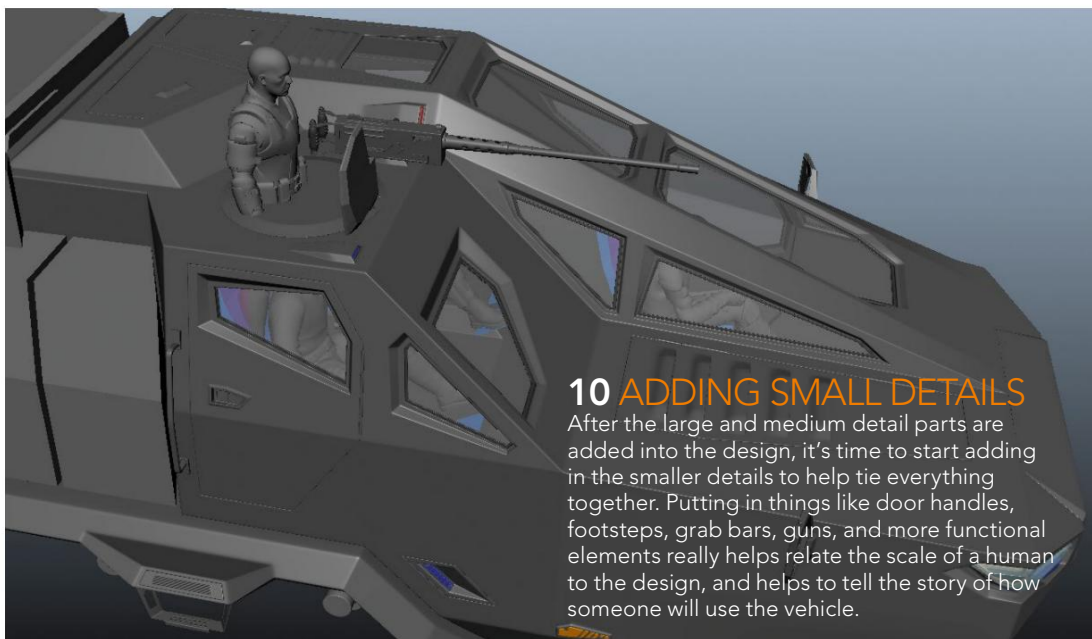
Once I am happy with my shapes and cutout openings, I start to clean up my model. To keep things manageable, I focus on working on one half of the model at a time. I clean up my ngons so they are quads and add in supporting edge loops. This will help control the curvature of my shapes when I smooth my surfaces with subdivisions. I'm not concerned by how my edges will match up with the other half of the model at this point.

## 9 MERGE THE SIDES

Once I am happy with each side individually, I go ahead and combine the two. At this point I need to make sure all my edges are connecting in the right places, which can be a little tricky. Sometimes you will have more edges on one side than the other and you might have a hard time keeping everything looping correctly and not starting to spiral. When I come to these complicated areas, I like to end the extra edge loops into triangles.

### TWO BECOME ONE

I always do this process on completely flat surfaces so there's no chance of wobbles, and if possible I will hide the triangles in a place that I know won't be seen very often. Here I hide most of my triangles on the bottom of the truck



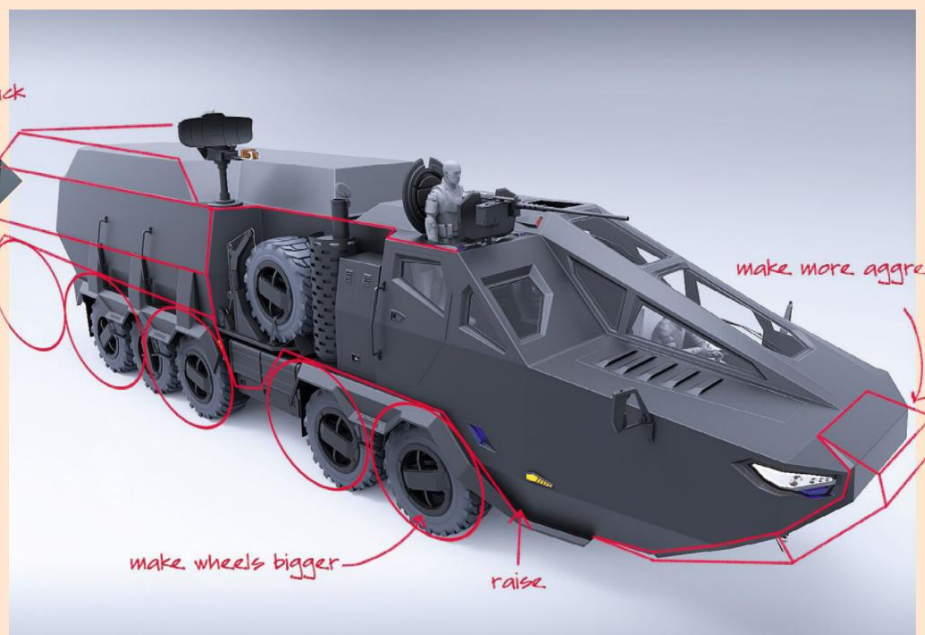
## 10 ADDING SMALL DETAILS

After the large and medium detail parts are added into the design, it's time to start adding in the smaller details to help tie everything together. Putting in things like door handles, footsteps, grab bars, guns, and more functional elements really helps relate the scale of a human to the design, and helps to tell the story of how someone will use the vehicle.

### EXPERT TIP

#### *Don't overly detail*

You should only add detail if it makes sense to the design and has a function. Remember, you need the right balance of blank spaces in your design and places for the eyes to rest.



## 11 RENDER AND REVISE

I am at a good point in my design so I jump into KeyShot to do some test renders. At this point I get a second pair of eyes on my design from my friend Travis Bourbeau, as it is easy to miss things that someone else might see. I realise I need to extend the rear and make the design more aggressive. It's harder to change a model around at this late a stage, but it will bother me forever if I don't make the changes.



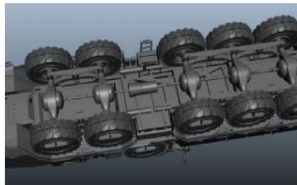
### ADDING THE DETAIL

## FALL IN LOVE WITH YOUR DESIGN



### ONE MAKE SURE YOU HAVE FUN

The first design for the wheels was a little simple and boring so I did a redesign with a new tyre tread and rim that was more fun. I'm glad I didn't settle as now the wheels are one of my favourite parts.



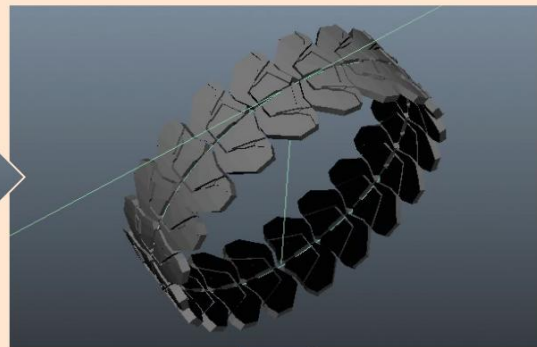
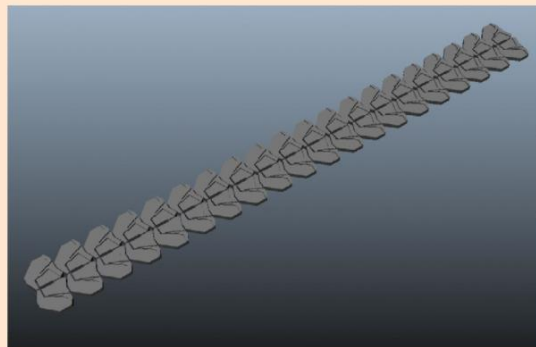
### TWO REMEMBER HIDDEN DETAILS

I design and model the parts under the truck that are mostly hidden in my final renders, but you get a sneak peak here and there, which sell the idea it's a real vehicle. These hidden details bring it to life.



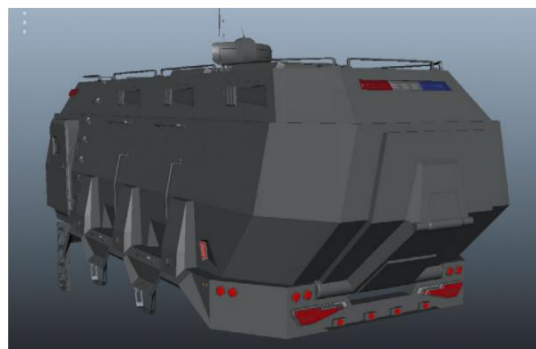
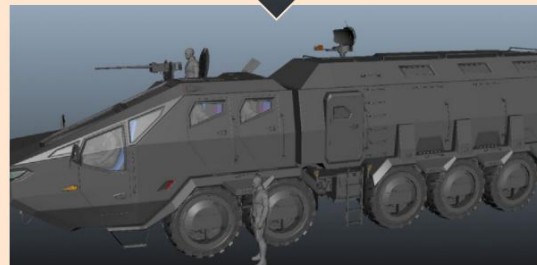
### THREE TELL A STORY

When designing, I'm telling a story with each move I make. You can see the scratches streaking back to tell a story that this truck drives at high speeds into dangerous scenarios.



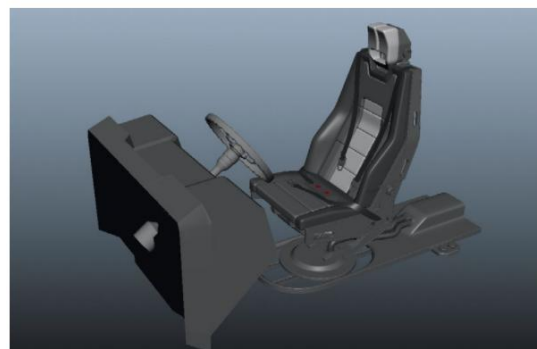
## 12 MAKE THE CHANGES

I jump back into Maya and redesign the wheels first. I end up making them 20 per cent larger, but I'm also not happy with the overall wheel design. To make the treads, I first model the tread out flat and then I use the Bend Deformer to make the tread into a circular wheel. Next I put the larger wheels in place and then adjust the overall dimensions of the truck to match the new wheel base.



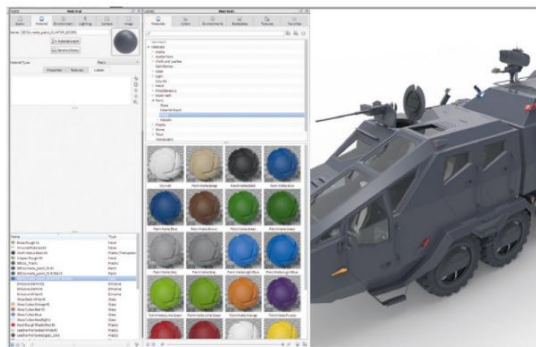
## 13 CONTINUE TO MODEL

I continue to design and build out the back of the truck. I add police lights, figure out how the back door will open, and design the brake lights. I design this truck from every angle so it is a complete design. I know the back will probably be shown less, but I still like to make sure it is well thought through, just in case a glimpse of it is seen in a render later down the line.



## 14 MODEL THE INTERIOR

Once the exterior design is complete I move to the interior. Due to the lack of time for now, I only design a few parts that can be seen through the windows, so the interior doesn't feel empty in the renders. Only a small hint of the interior will be shown but I still take the time to treat it as if it were a real thing; since I will be using it when I do the full interior later on I model out the full seat.



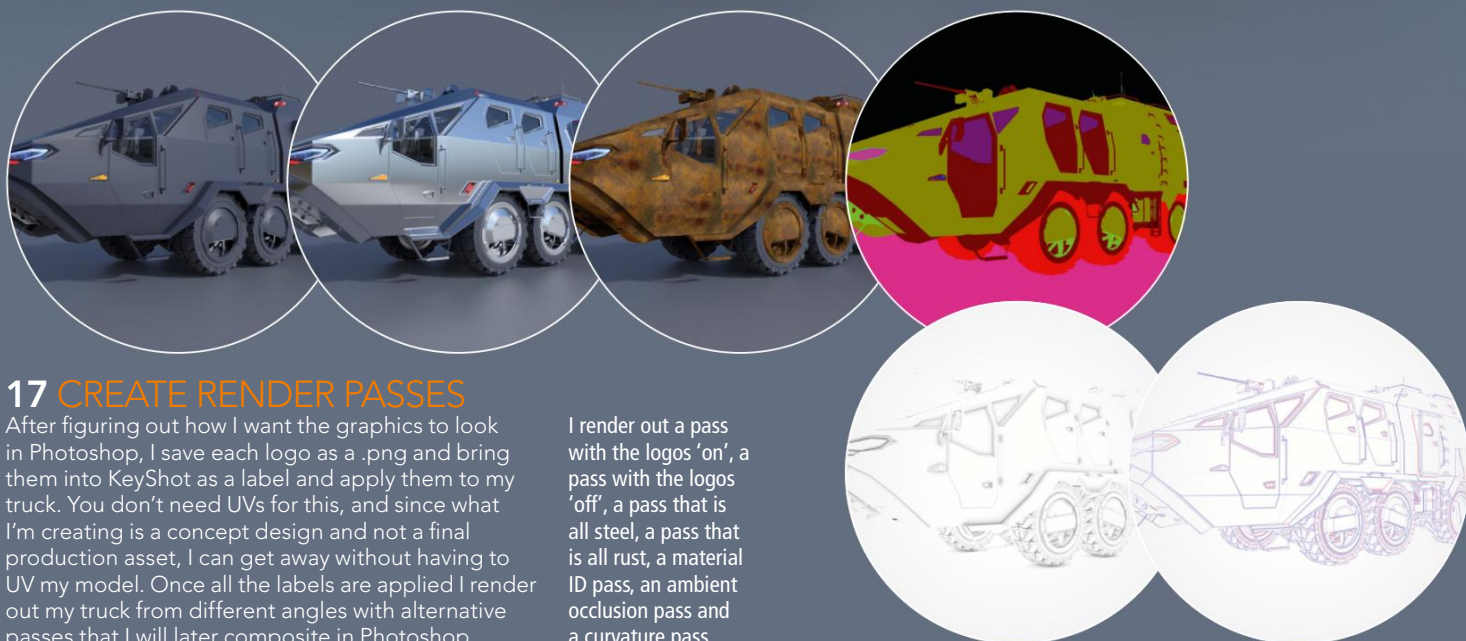
## 15 MOVE INTO KEYSHOT

The final design is now complete, so I send it to KeyShot 6 to do my presentation renders. I love using KeyShot because it is such a fun and easy program to use. They have a wonderful materials library, which makes it really easy to test out different looks. I know I want a more flat paint look to the truck, so I throw on a matte paint with a dark blue to see how it feels.

## 16 FINESSE IN PHOTOSHOP

I do a test render of the side view and bring it into Photoshop to test out graphical elements. I like creating each element on a separate layer so I can easily move them around to see which placement looks best. I look at references of police and military vehicles to see the graphics they use and incorporate the ones I like in my own way. I tuck text and decals into corners or line them up with cut lines in the vehicle so they feel like a cohesive part of the overall design.





## 17 CREATE RENDER PASSES

After figuring out how I want the graphics to look in Photoshop, I save each logo as a .png and bring them into KeyShot as a label and apply them to my truck. You don't need UVs for this, and since what I'm creating is a concept design and not a final production asset, I can get away without having to UV my model. Once all the labels are applied I render out my truck from different angles with alternative passes that I will later composite in Photoshop.

I render out a pass with the logos 'on', a pass with the logos 'off', a pass that is all steel, a pass that is all rust, a material ID pass, an ambient occlusion pass and a curvature pass



## 18 MAKE IT FEEL REAL

I composite all these passes in Photoshop so I can start to paint into the masks of the layers to add dirt and scratches. First I mask out some of the graphics so the truck doesn't look like it is brand new. Next I mask in some rust and steel where the paint has chipped and shows the raw material below it. This will give the vehicle a sense of being in use and place it in a world.



## 19 TWEAKING THE DETAILS

With the rust and chipped paint added, I now paint in some light dirt and some dark dirt to subtly show scratches and wear. I try to keep this subtle as it is easy to go crazy with it and make the whole thing super dirty. At the very end, I add a few Adjustment layers like Brightness and Contrast to make the lighting come to life. Now we have our final image. ■

### TAKE A STEP BACK

When you're close to the end of painting over your final renders, take a step back to ensure everything works as a whole. Zoom in and out to make sure the fine details you're adding read correctly



## TUTORIALS

Customise an explosion



# CREATE YOUR OWN CUSTOMISED EXPLOSION

**Greg Kulz** reveals how to demolish a building using Cinema 4D's Projection Man tool



### ARTIST PROFILE

**Greg Kulz**

Greg has worked in CG for over 15 years, on projects such as Team America, WWE video games, Ironman, and various short films. He's also had a number of product modelling contracts for corporate clients including Sony. [www.bit.ly/greg-kulz](http://www.bit.ly/greg-kulz)

### TOPICS COVERED

Projection Man  
FX Deformer  
MoGraph

After 15 years in the VFX industry, including time spent working on major gaming titles, I find that certain things never get old – and that definitely includes blowing stuff up. Something that used to only be legal for licensed demolition crews can now be done by anyone with a computer and a copy of Cinema 4D. Quicker, cheaper, and less likely to get you arrested!

This tutorial includes the steps I take to blow up a building in CG for a photorealistic scene – relieving me of the need to blow up an actual building. In this particular script, a meteor is striking a specific building and my job is to show the destruction of the building and damage to surrounding property.

You could create and destroy your own world with this workflow, using only Cinema 4D (C4D), though I like to also use Photoshop to create a more realistic and/or extreme view of the devastation left in my wake. The specific tool highlighted in this scene is Projection Man, but we also use the Explosion FX Deformer and MoGraph to make an exciting explosion.

If after looking over the workflow, you want to follow along with me step-by-step as I build and destroy, then visit [www.cmivfx.com](http://www.cmivfx.com) for the Cinema 4D Projection Man Fracture tutorial. Here you will find high end video training for the visual effects industry, from leading mentors.

For all the assets you need go to [creativebloq.com/vault/3dw206](http://creativebloq.com/vault/3dw206)



### JOIN CMIVFX

Subscribe today for training

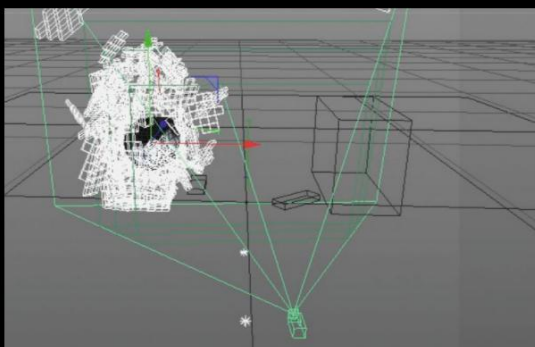
For over 10 years, cmivfx have provided valuable lessons in real-world and experimental techniques that define the very fabric of the visual effects industry. Our training material is unique as we provide you with knowledge from mentors who have contributed to a number of the world's most famous movies, advertisements, and media. [www.cmivfx.com](http://www.cmivfx.com)





## 1 LAY THE GROUND PLANE

The first step I take when deciding to hurl a meteor at a building is to use Cinema4D (C4D) to create a doodle object, enable bitmap, and bring in a single-point perspective photograph of the street scene, with the building I plan to model and then blow up. The next step I take is to match the viewpoints with landmarks in the image such as the horizon, a major street, and so forth. I then create the ground plane.



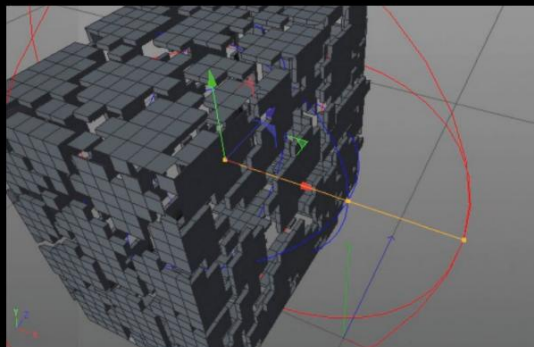
## 3 SETTING THE SCENE

The objects need naming; I call them 'hero building', 'building', 'car1', 'car2', and 'ground'. I decide they're going to be impacted by the meteor strike and set that up by adding Collider tags and setting up the cars as proxy objects. Next, set-up the camera mapping, which will result in a new mapped material with the camera locked in position. I select all of the Colliders and the master image and then use Projection Man to create the camera mapped materials.



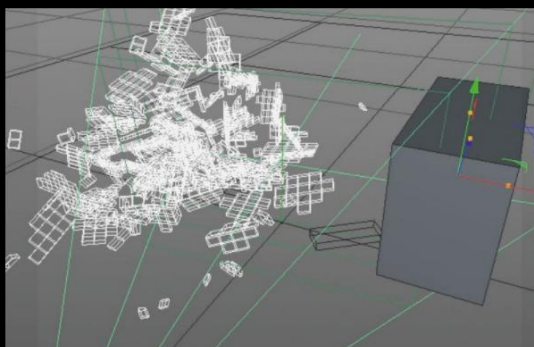
## 5 REVEAL THE AFTERMATH

Since every good meteor strike leaves a scene of devastation, I use Photoshop on my original street scene photo to show what's left behind after the hero building explodes. Use the Content Aware Fill and then use the Clone tool to create an alternate background. Make sure that the material that is altered is the background material not the hero building's material. Save and use this image back in C4D in the Luminance channel, in a third material.



## 2 BUILD BEFORE YOU DESTROY

Next, I bring in box objects and transform them to match the buildings in the forefront of the scene. For this scene, I don't need to worry about the ones in the back, as they won't be part of the destruction. Since I'm planning on some ricochet effects from the meteor strike on the building, I create additional box objects to be cars in the foreground of my scene.



## 4 BREAKING THE HERO

Next up, use Explosive FX Deformer to break the hero building up into chunks. I like to create about 15-25 subdivisions per side to have enough geometry to create a satisfying explosion. I also need to set up the dynamics at this stage and use the MoGraph menu to create a fracture object, make all of those building chunks into children, and set a rigid body tag on the fracture object. See the boxout (right) for baking chunks.



## 6 NATURAL DISASTER

Now that the scene is set, it's time for the fun part: blowing stuff up! I'm going to bring in my meteor from the upper right hand and set it up to hit the hero building. Then the chunks of debris will fragment and tumble, bouncing off of the other building and car proxy objects. I like to keyframe the meteor for at least two frames to give it some momentum and then let the dynamics take over and destroy at will. ■

### MATCHING UP

Lining up your building deflectors can be tricky in the camera mapped perspective viewport, so use the orthographic views to snug your edges to match your camera mapped image

### EXPERT TIP

#### Use perspective

If the scene in your new materials looks like crazy stretched out nothing, then just keep calm, undo and maximise your perspective viewport before rerunning.

### BAKE OBJECTS

#### Baking chunks into debris

To keep my texture on my chunks, I need to go back to Projection Man and use the Bake Object function to create a second UV mapped material. I also create angular mapping coordinates for all of my little textured chunks.

### FINISHING TOUCHES

With the simulation set up, fine tune the results by adjusting the mass and other dynamic qualities so the chunks behave like heavy rubble





3DS MAX | QUIXEL | XNORMAL | PHOTOSHOP | CRYENGINE

# CREATE A TEXTURE SET FOR GAMES

**Matthew Trevelyan Johns** shows how to create multi-purpose tiling trim textures for games



## ARTIST PROFILE

**Matthew Trevelyan Johns**

With a professional career spanning over seven years, Matthew now enjoys working as a senior environment and vehicle artist for Cloud Imperium Games.

[www.artstation.com/artist/trevelyan](http://www.artstation.com/artist/trevelyan)

The ability to create textures is a vital skill for any video game environment artist. Coupled with the advent of physically based shading in most modern game engines, it's now possible to recreate a myriad of realistic materials and apply them to the beautiful virtual worlds we create.

An environment you hope to recreate can feature literally hundreds, if not thousands, of unique texture details. It might be possible to create textures and shaders to represent every minute detail, but for every unique texture and shader loaded into a game engine, there's an incurred memory cost. While this might not be so important with pre-rendered scenes – the type you might see in a cutscene for example – when creating content for real-time rendering, these memory costs are very important. Too many polygons, textures and shaders in a level can translate to huge loading times when starting the game – or result in the level not loading at all!

With that in mind, an environment artist will often need to create multi-purpose textures that not only have portions that can be tiled over larger areas, but also have smaller, unique details and trim patterns. When combined with clever modelling and UV mapping, entire environments can be textured using just one or two of these textures in conjunction with some shader variations.

Here I'll create an example set of sci-fi wall panel textures and demonstrate how they can be used when texturing a 3D asset.

✓ For all the assets you need go to [creativeblog/vault/3dw206](https://www.creativeblog/vault/3dw206)

## KEEP IT REAL

Gather references of interesting and unique elements and those that are recognisable, to get a sense of reality



## 1 THEME AND REFERENCES

The theme of your project is likely to be set by your art director. For the purpose of this tutorial I'll be creating a texture for use on the walls of a sci-fi moon base, which will have a slightly nautical influence – just for fun! Gathering references is one of the most important steps when beginning any project and so using sites like Google, Pinterest and Flickr, I'll collect a lot of images and create a mood board to help me generate ideas.

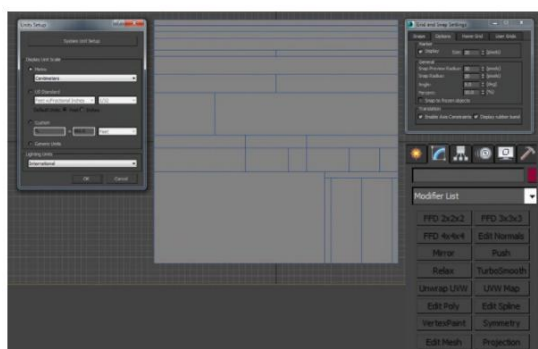
## TOPICS COVERED

- Shading
- Texturing
- Mesh creation
- Detailing



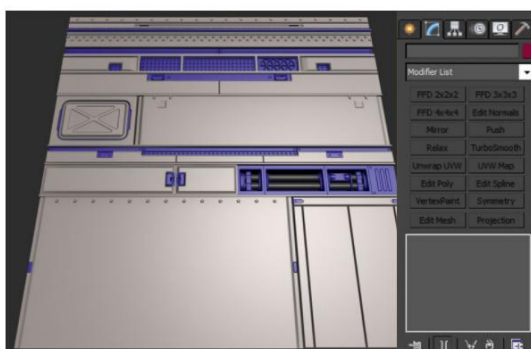
## CREATIVITY ON A BUDGET

Creating a versatile texture that can be used with multiple shaders allows the creation of a range of interesting assets while keeping texture memory costs to a minimum



## 2 PLAN THE TEXTURE

In 3ds Max I set my system units to Metric and Centimetres. I then enable Grid Snapping with spacing set to 5cm. I create a 200cm x 200cm plane, which represents the space my texture will occupy. Now I use the Quick Slice tool to slice along the grid lines and divide this plane into sections, or 'trims', that represent the different panels and details based on my reference. Include small, medium and large panels to maximise versatility of the texture.

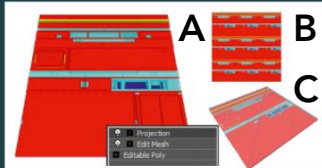


## 3 CREATE A HIGH-POLY MODEL

We need to create detailed meshes while studying references and replacing blockout panels. I'm creating high-res meshes using subdivision modelling in 3ds Max. This workflow involves creating a detailed mesh that accurately captures the silhouette and details of the subject, before applying the TurboSmooth modifier to smooth out the faceted polygons. The main objective is to create nice, detailed meshes from which we can capture normal and height map information.







## PREP MESHES

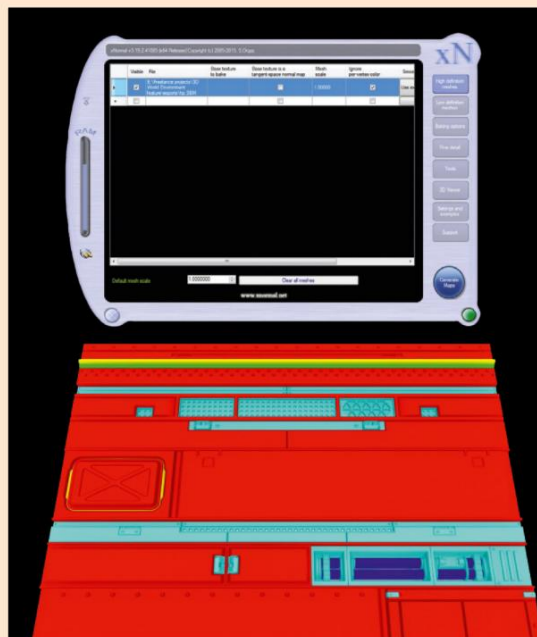
### Prep the meshes for export

I'll be using a free program called xNormal to generate normal, height, vertex colour and ambient occlusion maps. First I need to prepare my meshes for the program. I'll select my high-poly meshes and add a VertexPaint modifier colour to each part that represents a different material, as shown in figure A. Then I'll group the meshes and duplicate this group and position it as shown in figure B. I'll create a planar polygon keeping its UVs within the 0 – 1 area, then I'll add an edit mesh and a Projection modifier to the object. In the Projection modifier I'll use the Push option to expand the cage so that it rises above the height of the high poly meshes – this is my low poly mesh as shown in figure C. With xNormal installed on my machine I'm now ready to export the high poly meshes and the low poly mesh as .sbm files.

## EXPERT TIP

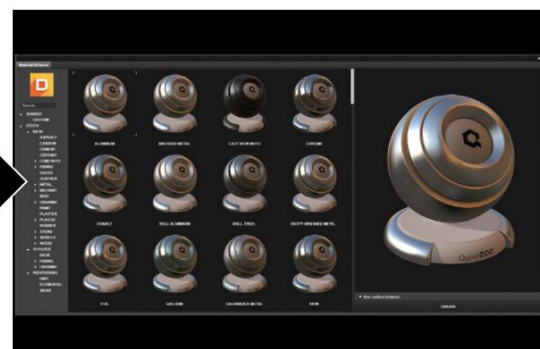
### Tiling solution

If you experience some tiling problems when applying certain materials with DDO, be sure to check the Seam Termination checkbox. This is found in the Options tab in the Base Creator window. Another option is to manually offset your textures by a small amount (try 64 pixels) before plugging them in.



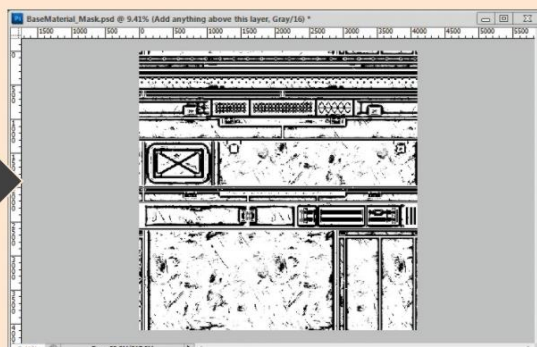
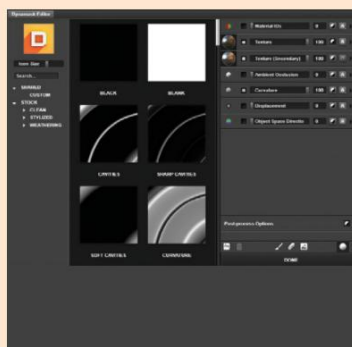
## 4 GENERATE TEXTURE MAPS

xNormal is a free program I use to generate maps. First I add my high and low poly mesh .sbm files to the corresponding tabs labelled on the right-hand side of the program interface. In the Low Poly tab I tick Use Cage and in the Baking Options tab I select Normal Map, choose an Output File location and press Generate Maps. I repeat this process to generate the ambient occlusion map, height map and vertex colour maps.



## 5 TEXTURING

Upon loading DDO I load my textures into the appropriate slots in the Base Creator window and set the options as shown in the image (left). Press Create Base>Editor. Loading the 3D viewer shows a preview of my mesh and holding [C] will display the vertex colour ID map I generated. Shift-click on any of the colours to bring up the Material Browser window as shown in the image (right), and select and apply materials to each part of the mesh.



## USING PATTERNS

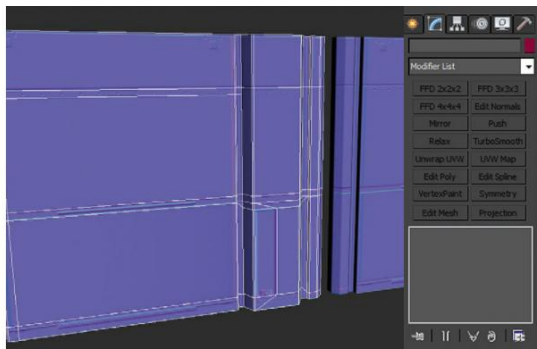
Variation in the texture details is essential, but don't introduce too many obvious patterns that might be easily spotted when parts of the texture are tiled or reused

## 6 CREATE TEXTURE VARIATION

Now basic material assignments are applied, it's easy to add wear and tear to them within DDO. Click on the mask icon to bring up the Dynamask Editor and from here you can fine tune the texture outputs to your liking by choosing from a variety of masks within the editor window. Using the menus in the editor, I create a clean version of my textures, as if they were new, and another version that is worn and damaged. Using DDO it's easy to isolate different areas in the texture to

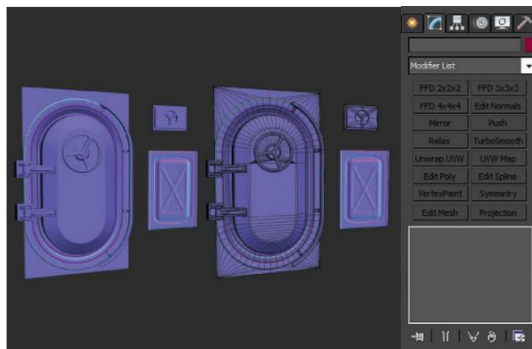
assign different colours or materials. However, rather than this one texture have lots of different coloured metal panels, I'll use a white material on all metal panels. Later I'll create multiple shaders in CryEngine and use the tint feature to achieve varying colours. This saves creating numerous colour variations of the same texture map, which are more costly in memory than creating a duplicate shader that uses all of the same textures, with an additional shader tint option enabled.





## 7 BACK TO 3DS MAX

With my textures saved, I test their usability by making a small section of wall. I plug my normal map into the Diffuse slot of my applied shader. This allows me to see every geometric detail that is baked into the texture so that I can be extremely precise with my UVs. Now I cut my mesh into sections that I can UV unwrap, making sure that I line my edges up with texture details and maintain a consistent texel density.



## 8 SET DRESSING

Now I've created my wall panels, I create some additional set dressing pieces which can be mapped to the larger, more plane area on the texture. I also cut some more unique panel details into the mesh to add further interest to the basic structure. Using the versatility of the texture to create an interesting base, before complimenting this with additional detail, is a sure way of creating visually interesting assets.



## CREATE DEPTH

### Parallax occlusion mapping

Parallax occlusion mapping in CryEngine uses a height map to create a much stronger feeling of depth in your textures. Figure A shows the height map and corresponding parallax occlusion effect, and figure B shows the same area of texture when using a grey fill to neutralise the height map information and the resulting effect in game. Cutting a mesh into sections and having lots of separate UV islands can create undesirable effects. To fix this, I'll remove the height map information from certain troublesome areas using a grey fill. I'll then change the value of the Height Bias slider in the CryEngine shader until the sections that are mapped to the 50 per cent grey parts of the height map are no longer showing any increased depth or rendering artefacts.

CLICK TO PLAY VIDEO  
[www.bit.ly/206-texture-1](http://www.bit.ly/206-texture-1)

CLICK TO PLAY VIDEO  
[www.bit.ly/206-texture-2](http://www.bit.ly/206-texture-2)

CLICK TO PLAY VIDEO  
[www.bit.ly/206-texture-3](http://www.bit.ly/206-texture-3)

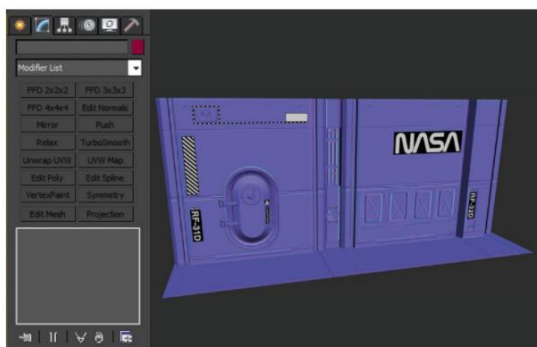
A

B

## 9 CRYENGINE BLEND\_SHADER

Loading my section of wall into CryEngine, I bring up the Material Editor and tick on the Blend Layer and Displacement Mapping Features in the Shader Generation Params tab. Earlier I saved damaged, as well as clean versions of my textures, so at this stage I go ahead and plug them all into the shader. Finally, I add a greyscale texture into the Blending Map slot; I like to use just one of the grunge masks from my DDO outputted .psd files at this point. You should

note that the blendshader can be controlled with the Blend Factor and Blend Falloff sliders, as well as by vertex alpha values in your mesh. You can see this in figures A and B in the screens above, which show a comparison between clean and worn versions of my shader for guidance. You can download high resolution versions from this issue's online Vault for your reference.



## 10 FINAL TIPS

In my final image shown at the start of this tutorial, I have used two duplicate versions of my shader, coupled with a coloured tint to create the blue and dark grey painted metals. You can see the original multipurpose trim textures are extremely versatile when used correctly. Combining clever modelling, UV unwrapping and tinted shaders, it's possible to texture a huge variety of assets. I also employed additional set dressing in the form of decals to add extra detail. ■







ZBRUSH | MAYA | PHOTOSHOP

# IMPROVE YOUR FIGURE SCULPTING

*Jeen Lih Lun* offers an overview of how to create a realistic figure full of movement



## ARTIST PROFILE

### Jeen Lih Lun

Jeen has worked in video games for over seven years and is a senior artist at Ninja Theory in the UK. Her latest title was Disney Infinity 3.0 where she modelled Anakin, Obi Wan, Sabine and other characters.

[www.jeenlihlun.com](http://www.jeenlihlun.com)

The title of this image is Lady in the Wind. I enjoyed every step when creating it, especially sculpting the torso and making the hair for this image. I set myself a four-week window for this project, but unfortunately I didn't have a lot of time left for detailing the fingers, feet and the face because I spent far too much time on the torso and experimenting with the hair.

For the body, I start with low subdivision to get the proportions and general landmarks right. When I am comfortable with the form, I increase the subdivision for adding details and subtleness.

I use a lot of reference images and anatomy books to help me when I sculpt the body and I would recommend you do the same when working on a project like this. Two anatomy books that I recommend are Artistic Anatomy by Paul Richer and Atlas of Human Anatomy for the Artist by Stephen Rogers Peck. (I also took an anatomy course by Scott Eaton, which helped me a great deal to understand the complicated human body). For reference when working on the face, I looked at Mastering Portraiture by Philippe Faraut.

Instead of using FiberMesh and Maya nHair, I used a 3D poly card

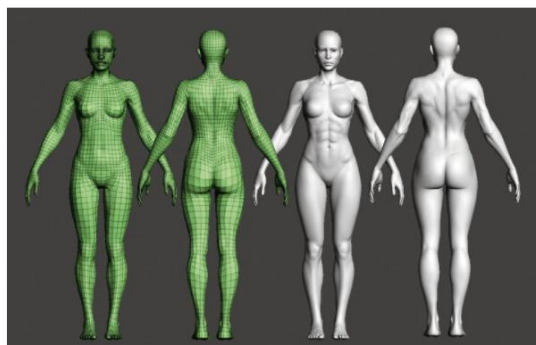
for the final render. This was to speed up the rendering time and I wished to learn a new technique as it could be beneficial when it comes to making game characters in the future.

I use Maya, ZBrush and Photoshop primarily to create Lady in the Wind. I did some tests on the cloth with Marvelous Designer but didn't use that asset in the final render. I also used KeyShot to render a couple of full body renders from different angles and would always recommend experimenting with your projects.

For all the assets you need go to [creativebloq.com/vault/3dw206](http://creativebloq.com/vault/3dw206)

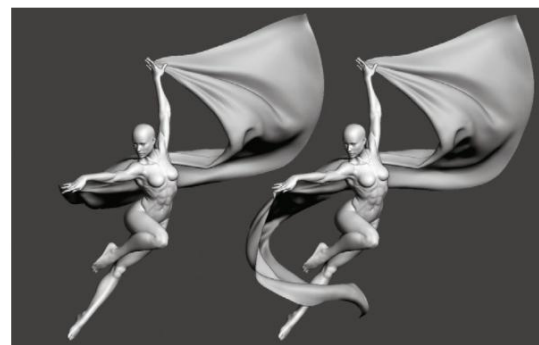
## EXPERT TIP

**Use a low-poly count**  
Keep your hair poly count fairly low because you can then use this to create a hair card in Maya.



## 1 START WITH AN A POSE

I start with a base model in the standard A pose. With the lowest subdivision I make sure that I get the general proportion, form and landmarks as accurate as possible. Next I sculpt a pass for muscle placement, I do this roughly and very boldly on the second subdivision, so when I pose her I will use this as a guide to ensure the continuity in the sculpt.



## 2 FINESSE THE POSE

When I am comfortable with the form I move on to pose my character using Transpose Master. Always keep a reference photo to hand when working on this in order to ensure you get the pose looking good. I want to experiment with a veil to achieve the most dynamic result possible. I make this in Marvelous Designer and import it back into ZBrush as a base. I continue to alter the shape of the veil to get a dynamic silhouette.

## TOPICS COVERED

Anatomy  
Sculpting  
FiberMesh



# LADY IN THE WIND

Jeen studied anatomy and sourced plenty of reference material when working on her figure sculpt





SCULPT IN  
ZBRUSHCREATING A  
DYNAMIC POSE**ONE KNOW YOUR ANATOMY**

I mainly used the Clay, Standard, Smooth, Dam\_Standard and hPolish brush. The shoulder area was tricky with so much articulation going on. Real life reference in motion to learn how the form changes when the arms are raised was key.

**TWO CHECK YOUR MODEL**

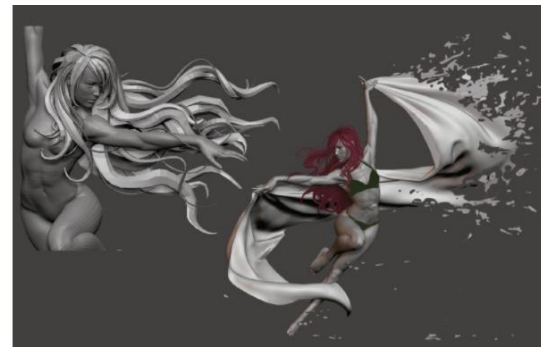
When posing a character, check the model from all angles to ensure the character has the balance in terms of centre of gravity. Always check the silhouette of the character to make sure the pose is strong.

**THREE ADD APPENDAGES**

Apart from the dynamic poses as a whole, the hands, fingers and feet are crucial in order to make the subject expressive and emotional.

**3 MODEL AND CHECK**

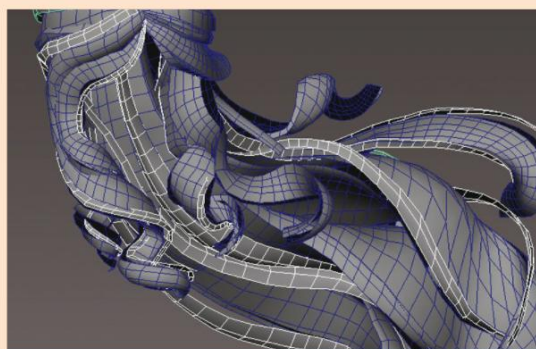
I continue to add volume, focusing on the anatomy that makes sense with this pose. I pay a lot of attention to the bone structure, such as the ribcage, clavicles, knees and fatty areas – don't just focus on the flexing and relaxing muscle areas. I frequently use different materials and lighting to review my model from all angles. Sometimes I also take screenshots and do a quick écorché pass on them to check if they are accurate.

**4 TEST IDEAS**

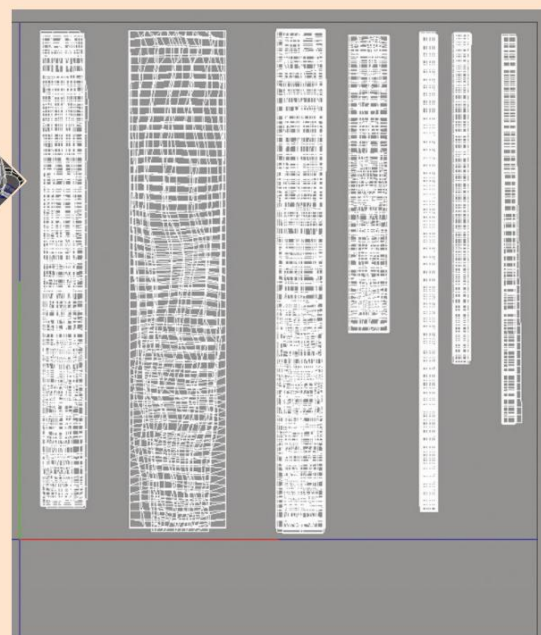
To create the clothing, I draw a mask on the body and extract the mesh. I use a combination of ZRemesher and the Maya Modelling Toolkit for retopologising. I take a screenshot of the character, and in Photoshop I paint over some hair and the veil for concept development. In the end I decide to flip the character around and discard the veil due to time limitations. I also make a quick concept sculpt in ZBrush for the hair that I didn't end up using.

**5 HAIR MOVEMENT**

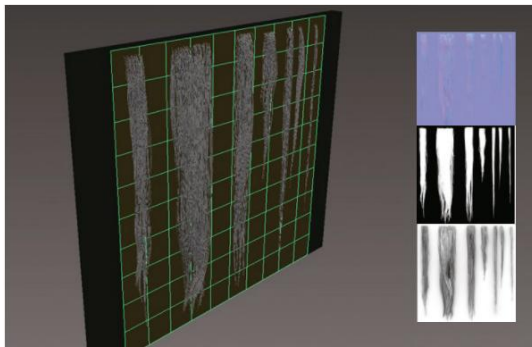
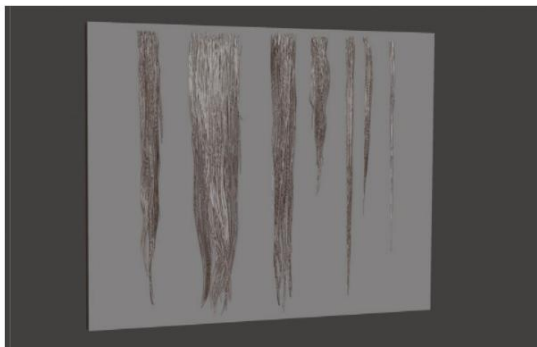
I want the image to look dynamic yet natural, therefore the flow and direction of the hair is crucial to the overall figure. Once comfortable with the flow of the hair I use the IMM\_Hair brush I downloaded online to draw the hair's poly mesh over the second concept sculpt of the hair. Using the Move, Rotate and Scale tools I can make wavy, twisty forms to give the figure life. The IMM\_Hair brush can be found at [www.zbrushcentral.com](http://www.zbrushcentral.com) under the thread called Insert Mesh Brush Repository.

**6 SPLIT THE HAIR MESH**

I export the hair mesh into Maya where I split up the mesh into smaller strands of hair. I unwrap the UVs using Utilize, Move and Sew UV Edges in order to create very clean UVs for each hair strand. I use Unfold with UV border pinned to relax the UV a little. I arrange the UVs vertically for the anisotropic to work correctly. I need six different variations of hair strips for the alpha, so I arrange the UVs into six groups.







#### SEPARATE YOUR HAIR STRANDS

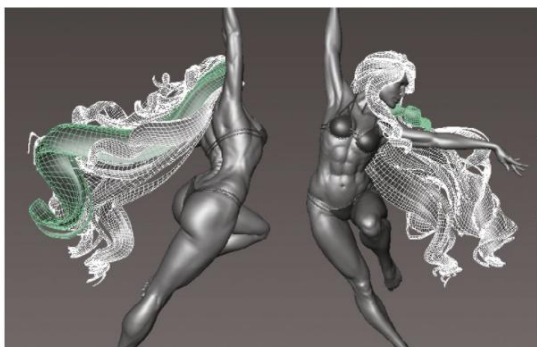
Divide the hair mesh into smaller strands so the form has more variation

## 7 USING FIBERMESH

Instead of handpainting the hair like I did for the characters in DmC and Silent Hill: Shattered Memories, I want to use FiberMesh this time so it is more intuitive and I can bake the normal maps to increase the fidelity of the hair. I create six groups of hair with FiberMesh against a plane and I move them as close to the plane as possible. I make each hair group look different in terms of length, volume and clumping.

## 8 CREATE AN OCCULSION MAP

I export the FiberMesh and the plane to Maya and assign a black diffuse to the flat plane. I then create a low poly plane (square) and lay this on top of the FiberMesh and plane form to bake the normal map, diffuse map and ambient occlusion in 4kx4k textures. I consider creating coloured hair, and the occlusion map would be handy, but I decide to keep it simple so I don't use occlusion for the final image.



## 9 EXPERIMENT WITH THE HAIR

To get a better feel of the anisotropic I create another very smooth hair mesh in ZBrush and I use this to transfer its vertex normal to the hair poly mesh in Maya. However, I run into some rendering issues with this method because of the waviness and the length of the hair. As a rule, I think this method works best on short to medium hairstyles, but you never find these things out without trying, so keep experimenting.

## 10 RENDER TEST

I use an anisotropic material for the hair and arrange the UVs so they match the texture. I increase the subdivision level for the hair with Smooth in Maya before I render the final image. Daniel Crossland, my lead at the time, kindly shares with me his render scene that uses mental ray. With this as a starting point, I adjust the colour, direction, intensity of the light and bounce card to create the desired mood. I also

use KeyShot to render a couple of images for comparisons. I downloaded some HDRI maps from the sIBL website to experiment ([www.hdrilabs.com/sibl/archive.html](http://www.hdrilabs.com/sibl/archive.html)). I particularly like the Ditch River and Alley map from this site. I render a beauty and an alpha pass, bringing them into Photoshop, where I can tweak the colour and add some subtle effects to complete the final image. ■







STINGRAY | MAYA LT | MAYA | 3DS MAX

# GET STARTED IN AUTODESK'S STINGRAY

*Matthew Doyle* reveals how to set up and start creating assets in Autodesk's new game engine, Stingray



## ARTIST PROFILE

**Matthew Doyle**

Matthew is a game maker, and passionate about 3D and 2D art. He enjoys building worlds and making characters that inspire. Helping others learn the tools is also a daily part of what he does.

[www.matthewdoyle.com](http://www.matthewdoyle.com)  
[www.stingrayengine.com](http://www.stingrayengine.com)

With Unreal Engine and Unity hogging the scene it can be difficult for a new app to break in, but Autodesk is making some inroads with its Stingray platform. Released in August 2015, Stingray is an easy-to-use real-time rendering software and 3D game engine that works well with Autodesk Maya LT software.

For this tutorial you won't need to know anything about game engines – the goal is to introduce you to the software and how to set it up. We'll look at importing files from Maya LT directly into Stingray as well as covering the

core features for setting cameras, animation and creating and using Flow nodes.

Stingray's not only aimed at game artists, either. Its real-time capabilities mean it's good for use in most 3D visualisation.

If you're completely new to Stingray then visit Autodesk's site for a free download of the software at [www.autodesk.com/products/stingray/free-trial](http://www.autodesk.com/products/stingray/free-trial). You can download more free project files to help with this tutorial at [www.autodesk.com/makegames/game-kit](http://www.autodesk.com/makegames/game-kit). And of course, follow along with the video walkthrough you'll find

at [www.bit.ly/206-sting](http://www.bit.ly/206-sting). Before we begin you'll need to set up Interop with Maya, Maya LT, and/or 3ds Max. Stingray works really well with all Autodesk software.

In order to get started, go to C:\Program Files\Autodesk\Stingray\[your version number]\extras, and run StingrayDCCLink2016.msi to install the plug-in that enables Interop. In Maya and Maya LT, you'll find the Stingray menu at the very top. Now we're ready to go, so let's get started!

For all the assets you need go to [creativebloq.com/vault/3dw206](http://creativebloq.com/vault/3dw206)

## EXPERT TIP

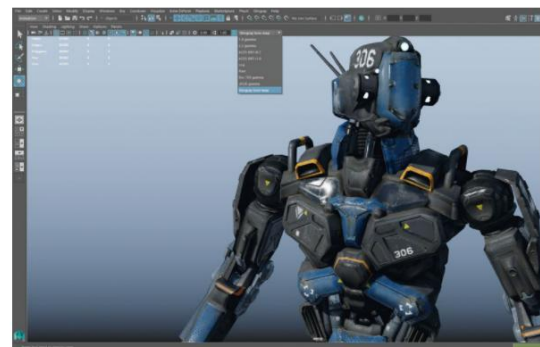
### Additional animating

If you need to add any other animations, such as Walk, then simply create an animation state machine, as detailed in Step 7.



## 1 SET UP CAMERA LINKING

You can slave the camera in Stingray to your Max or Maya camera and vice-versa. Go to the Stingray menu in Maya or Max, ensuring Connect is on. Select either 'Viewport Camera Link (as Master)' or '(as Slave)' and enable Live Camera Tracking. Orbit, pan, or zoom the camera in Maya or Max and the camera mimics those movements in Stingray. If you chose 'as Slave' doing the same in Stingray makes the camera in Maya or Max mimic Stingray's camera motions.



## 2 MIMIC LIGHTING IN MAYA LT

In Maya and Maya LT, you can mimic the lighting environment of Stingray by setting the Color Management drop-down above the viewport to Stingray tone-map. Remember, in Maya [Alt]-left mouse orbits, [Alt]-middle mouse pans, and [Alt]-right mouse zooms. And it works the same way in Stingray.

## TOPICS COVERED

- Setting up
- Import and export
- Animation
- Flow nodes



**TAKE CHARGE**  
Light, animate and even  
control your assets from  
Autodesk's Stingray  
game engine





## TUTORIALS

Get started in Stingray

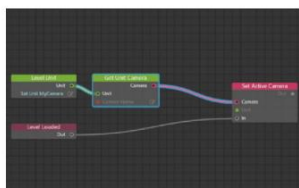
### FLOW NODES

## CREATE GAME LOGIC USING FLOW



### ONE ADD A CAMERA

Let's add a game camera to the level in step 11. Go to the Create window in Stingray, and select Camera at the top. Choose the Camera object; click anywhere in the viewport to create it. Right-click to exit creation mode. Go to the Property editor and name the camera MyCamera.



### TWO SET ACTIVE CAMERA

Click the Level Flow tab at the top. Right-click and choose Event>Level Loaded. Right-click again and choose Unit>Get Unit Camera. Highlight the camera in the viewport, right-click in the Level Flow window and choose Create Level Unit MyCamera. Right-click once more and choose Camera>Set Active Camera.



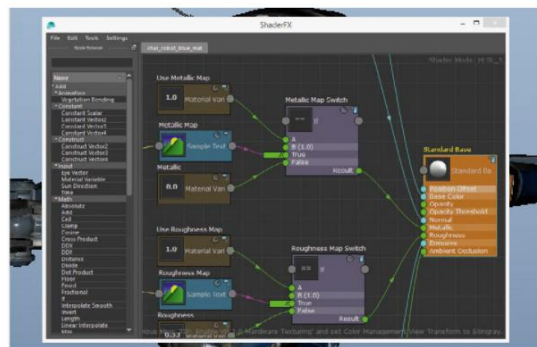
### THREE FINAL SETUP

Now click and drag from Level Unit's output, to Get Unit Camera's Unit input. Next, drag from Get Unit Camera's Camera output to Set Active Camera's Camera input. Last of all, drag from Level Loaded's Out output to Set Active Camera's In input.



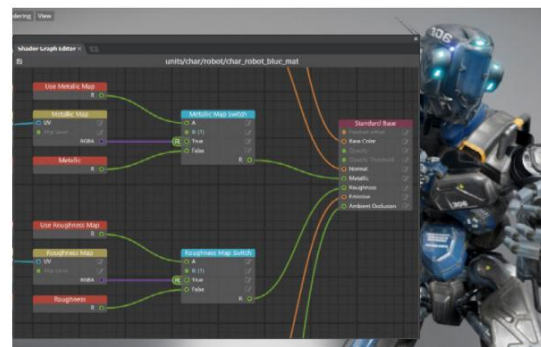
### 3 ASSET UPDATING

Sending your assets from Maya, Maya LT, and Max to Stingray is easy using FBX files. FBX files can hold a lot of things, including mesh data, animation clips, lights and camera, LODs, and even HumanIK character definitions, as well as ShaderFX runtime shader graphs. To send your stuff to Stingray, just choose File>Send to Stingray, then All or Selection. It's that simple.



### 4 EXPORT FROM STINGRAY

For assets already in Stingray, you can send them back to Maya or Max easily. First, select the asset in the viewport, right-click, and choose Find Asset in Browser. From there, right-click the selected asset in the Asset Browser at the bottom and choose Send to Maya or 3ds Max. This will load Maya or Max with the asset. You'll see a green 'Connected to Stingray' at the bottom in Maya. Click the Update button when you're finished editing to send it all back to Stingray.

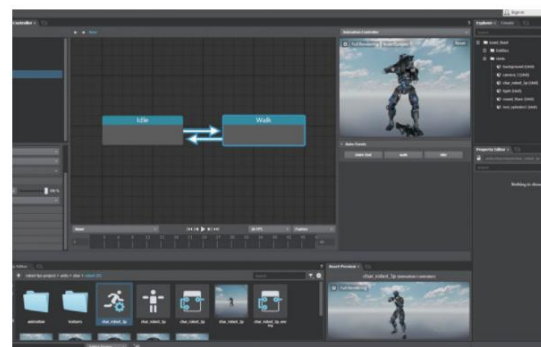


### 5 PBR SHADERS IN SHADERFX

With ShaderFX, you can set up a Physically Based Shader in Maya LT and send it to Stingray, where you get the same shader graph – no need to rebuild. In Maya, right-click your object and select Assign New Material. Select the Stingray PBS material. Open Maya's Attribute Editor and select the Stingray PBS material tab at the top. You can see the shader graph by clicking Open ShaderFX, but all you really need to do is fill in the blanks in the Attributes rollout.

### 6 SETTING UP TEXTURES

For starters, enable all the maps you plan to use, such as Color Map, Normal Map, Metallic and Roughness, and so forth. Then browse to, and select, your texture files for each of the empty Texture attributes by clicking the checkerboard button next to the texture text field. This will bring you to the file tab in Maya, where you can select the location of the texture file you want by clicking the folder icon next to Image Name.



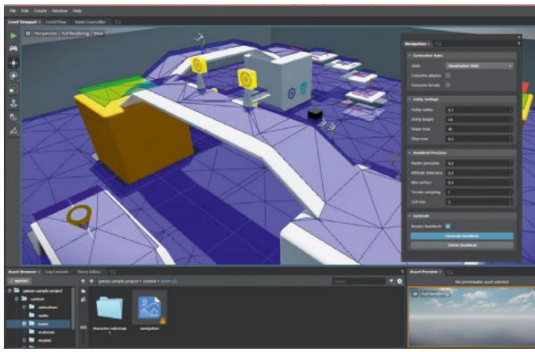
### 7 CHARACTER ANIMATION

To add animation to characters, you need to create an animation state machine. Right-click the character you want to animate in the Asset Browser, and select Create Animation Controller. Double-click the new animation controller to open the Anim Controller. Delete the Empty state node. Now right-click in the same location, and choose Clip State. On the left, under General, enter a name, such as Idle. Select an animation from the Animation – Add Clip drop-down.

### 8 ADD ANIMATION EVENTS

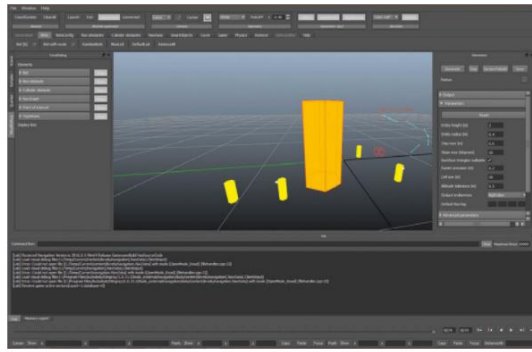
To add events that tell your character when to move from Idle to Walk, right-click AnimEvents in the top left list, and choose Add Anim Event. Select the new anim event and rename it 'onWalk.' Click and hold on the first state (Idle), then drag over to the second state (Walk) to create a transition. Click the transition arrow and set the On drop-down to onWalk. Now you simply need to set up your code, or use Stingray's visual scripting tool Flow to fire anim events.





## 9 CONTROL NAVIGATION

Navigation is an AI pathfinding solution to quickly create navmeshes and other tools that allow your AI to move through the game world in a credible fashion. Go to Window>Navigation. At the bottom, click Generate NavMesh to start the process. You can control NavMesh generation in the same window. For example, changing Slope max to 20 will disable NavMesh generation on any slope steeper than 20 degrees, so your AI can't path up those slopes.



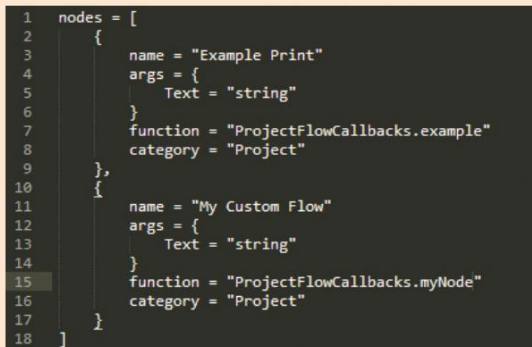
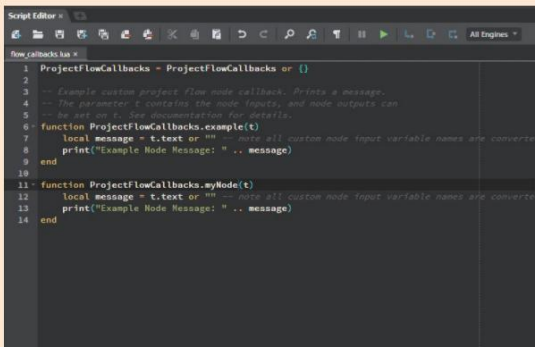
## 10 DEBUG YOUR AI

Use NavigationLab to debug your AI. First run a level with the Play button on the left toolbar. Return to Stingray and choose Window>NavigationLab. In the Remote application panel at the top, hit Connect. Hit Connect again in the 'Connect to game' window. In the Visual debug window, choose Cancel. You're now connected. In the Camera panel at the top, set the drop-down to Game. If you move around in the game window, NavigationLab mimics the camera motions.

### EXPERT TIP

#### Animation setup

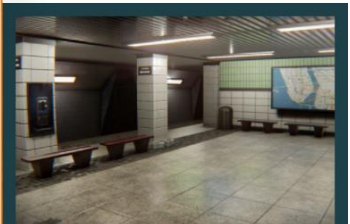
If you need to add any other animations, such as Walk, you simply repeat the process in step 7 as many times as required.



## 11 CREATE FLOW NODES

You can create custom Flow nodes in Stingray using the human-readable Lua scripting language. From the Project Manager, select the Templates tab and create a new Basic project. In the Asset Browser, scroll down to your project's script folder and open it. Right-click the lua folder and choose Show in Explorer. Double-click the global.script\_flow\_nodes file to open it in a text editor. This JSON format file allows us to add custom Flow nodes to the project.

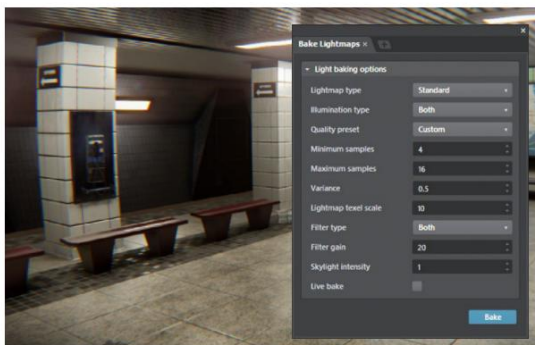
Simply add your custom node using the provided Example Print node as a guide. For example, add a new node named My Custom Flow. Change the function to ProjectFlowCallbacks.myNode. Save the file. In the Asset Browser, enter the lua folder, and double-click flow\_callbacks to open it. Copy the example function, but change it to function ProjectFlowCallbacks.myNode(t). Save the file. Now, right-click in the Level Flow window, and choose Project My Custom Flow to see your new Flow node!



## ADD VFX TO A LEVEL

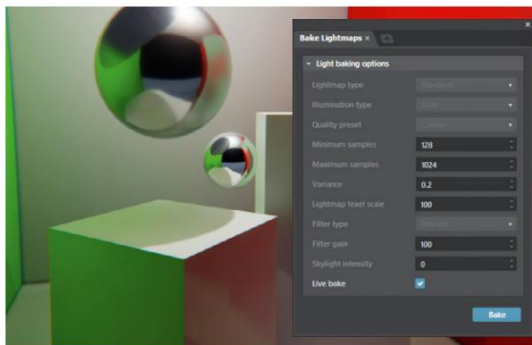
### Screen-Space Effects and the Shading Environment

Screen-Space Effects can add a lot of oomph to your levels – everything from ambient lighting effects and reflections to camera effects like lens dirt, light blooms, and depth of field. To take advantage of these effects, we need to make sure our level has a Shading Environment entity. The good news is that Stingray creates one for us when we create a new level. Locate the Explorer panel on the right-hand side of Stingray, and click the plus icon next to Entities, under Level\_Root. You should see midday\_shading\_environment (Entity). Select it to show all the editable properties below in the Property Editor. Select any of the subcategories, such as Screen-Space Ambient Occlusion. Enable it by clicking the Enable checkbox. Change the Quality, Radius, and Intensity values until you get a good look in the viewport.



## 12 LIGHTING WITH BEAST

Stingray has a fast global illumination lightmap baker called Beast. Before you can use it, ensure all your assets have lightmapping UVs on channel 2 in Maya, Maya LT or 3ds Max when exported to Stingray. In Stingray, select an asset in a scene. In the Property Editor, select the top level of the asset hierarchy and ensure Beast Lightmapping is enabled. Under Beast Settings in the hierarchy, select the surface object and verify Bake target and Contributes are checked.



## 13 USING LIGHTS IN A SCENE

For any lights in the scene, select the light component in the hierarchy and make sure Cast Shadows is enabled (if you want them to cast shadows), and Baked should be enabled if the light is not dynamic or moving. Now, from the Window menu, choose Lighting>Bake Lightmaps. Set the Quality preset to High, enable Live bake at the bottom, and click Bake. That's all there is to it! ■





**MODO | 3DS MAX | PHOTOSHOP**

# SPEED UP YOUR GAME ASSET CREATION

MachineGames' *Matthias Develtere* reveals the pro workflow to create environment assets for video games



## ARTIST PROFILE

**Matthias Develtere**

Matthias is a junior 3D artist at MachineGames, who's worked on the Wolfenstein series. He likes to work on environment assets and vehicle models. [develterematthias.wordpress.com](http://develterematthias.wordpress.com)

Artists who have made a video game environment before will know how much time it takes to make everything from scratch – from high-poly to low-poly versions for every model, to unique textures for all of them. The result is you end up doing the same props over and over again. For next-gen games, knowing how much further you can push the amount of detail could really be a nightmare. So let's come up with some unique and fresh ideas of how to speed up your pipeline.

The aim of this tutorial is to give you some tips on how to make detailed environments without

having to go through the same lengthy and expensive pipeline for every asset. Still, if you want to make high-poly models then you're in luck, because we are going to cover how to best use the Smooth Edge Shading tool. This is a really useful tool because it allows you to kitbash your model in a really short amount of time.

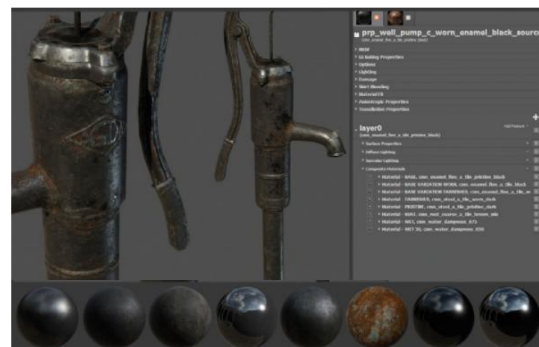
As well as this, I will share my process for using the Hotspot Texturing tool in Modo and how to combine this with tileable texture patterns for effective and quick prop creation.

Throughout this tutorial I will continue to come back to the

same fundamental idea: how to save time and end up with a consistent design/environment for a video game.

To follow along with this tutorial you can either use Modo or 3ds Max; I suggest Modo because I believe its pipeline is easier. You can download the script and plug-ins for both software, as well as my work file for this fan art take on a level from Splinter Cell, to explore the scene and polycount. Plus, take a tour of the environment at [www.skfb.ly/JSR7](http://www.skfb.ly/JSR7) to get a good idea of how I work.

For all the assets you need go to [creativebloq.com/vault/3dw206](http://creativebloq.com/vault/3dw206)



## 1 CREATE MEGA 3D MODELS

Let me first explain mega 3D models. These are models that have a lot of shading info, which means you can chamfer all the big edges. This way you get really nice shading. We will texture these models with tileable textures, but don't panic we will go over all of this. Mega 3D models means there's a limited size of the level but an endless variation within it because you can swap out the tileable textures. This means your pipeline is less expensive and less destructive.

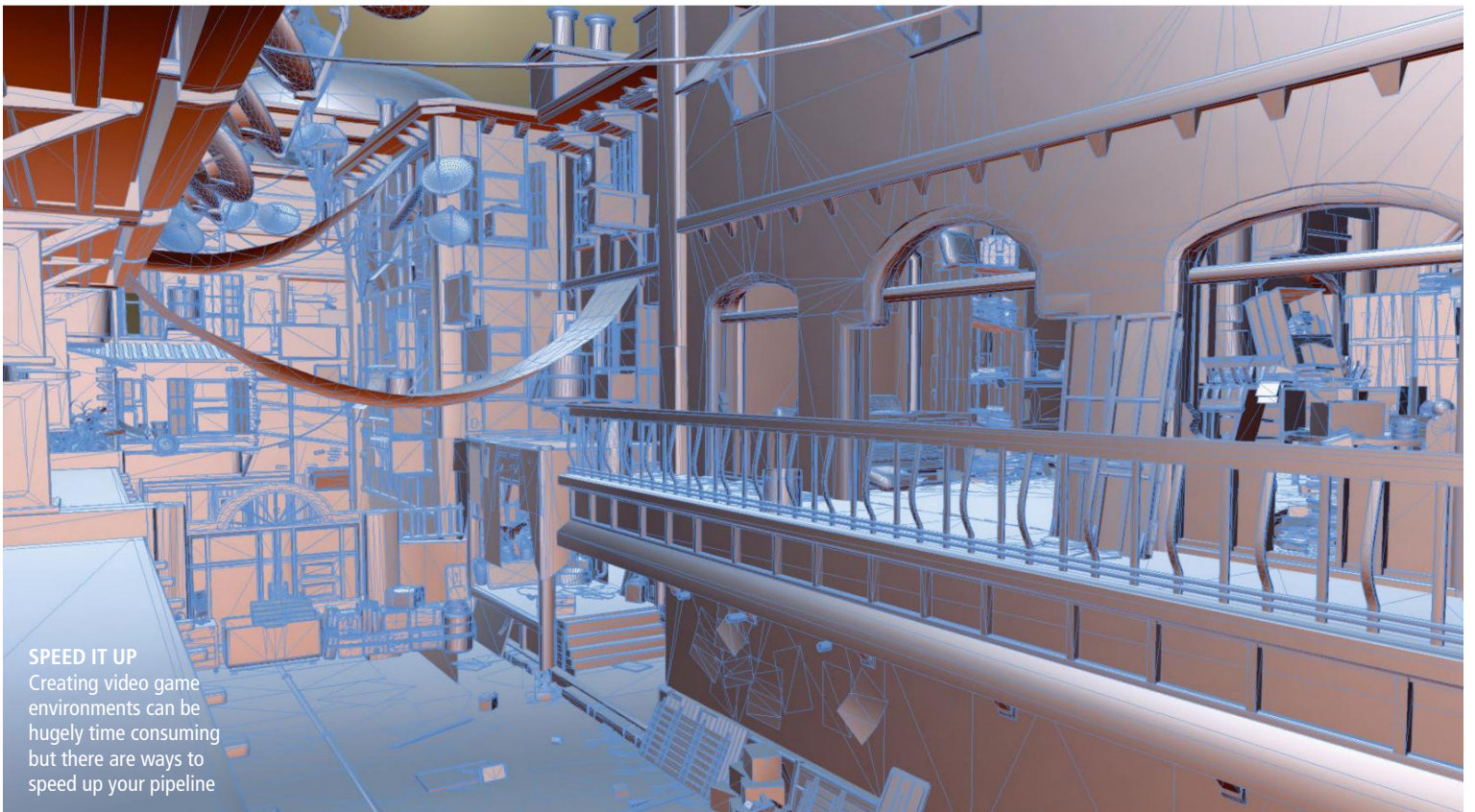
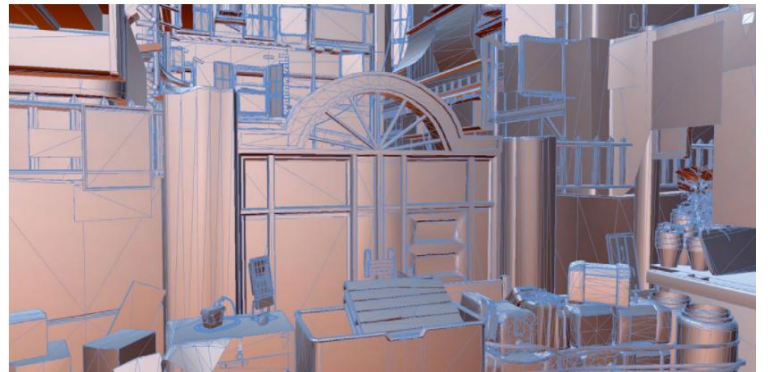
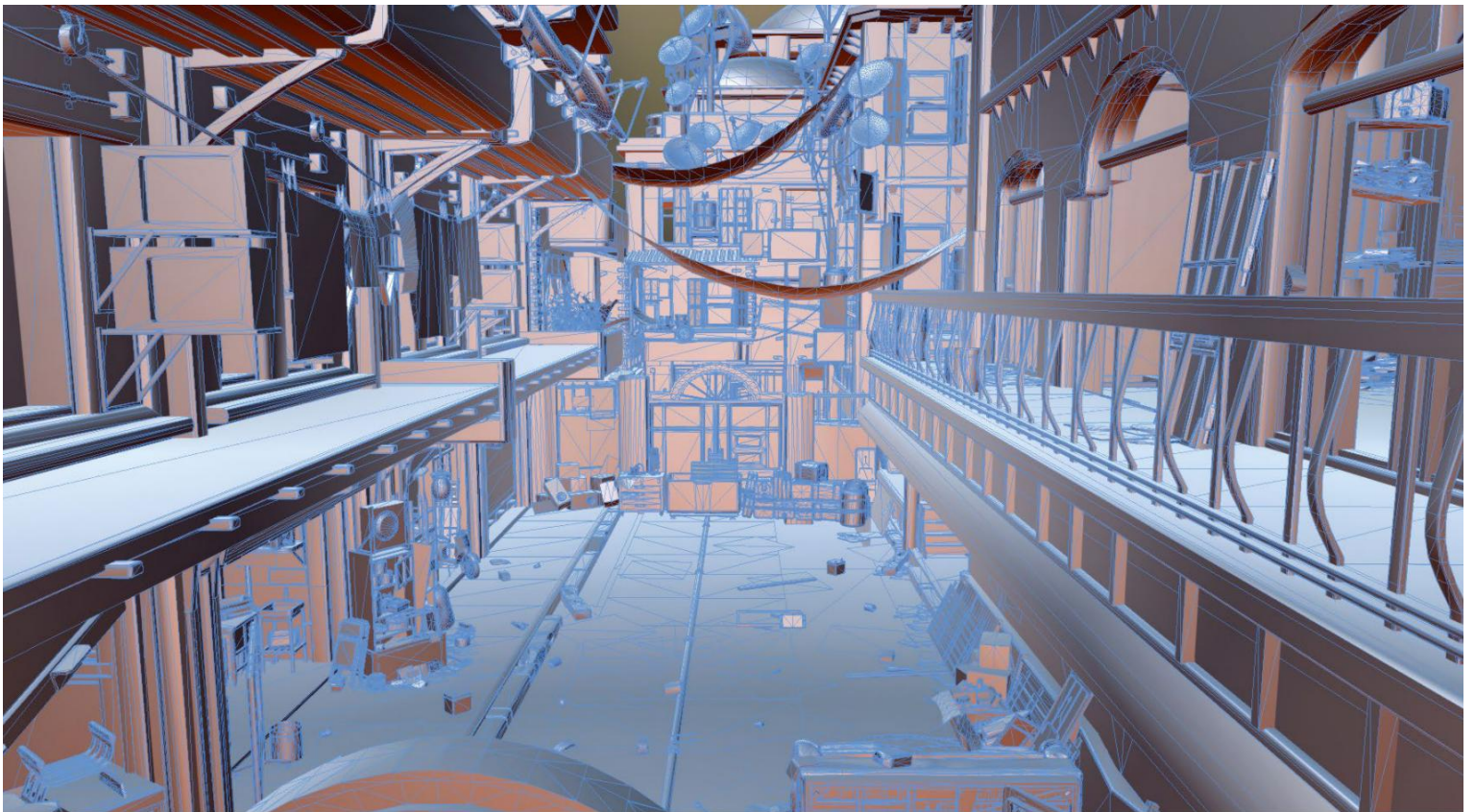
## 2 USING TILEABLE TEXTURES

Using tileable textures with custom normals has a lot of specific strengths. You can combine many materials in every asset; the game has a small footprint by using many tiny textures. For example, Instead of having a unique 4K texture you can get away with a lot of small 512 textures. Your model is also iteration-friendly, meaning you can add new parts at any time or tweak your geo as much as you want because you don't have to bake normal maps.

## TOPICS COVERED

- Project preparation
- Installing scripts
- Prop modelling
- Environment tips
- Hotspot texturing

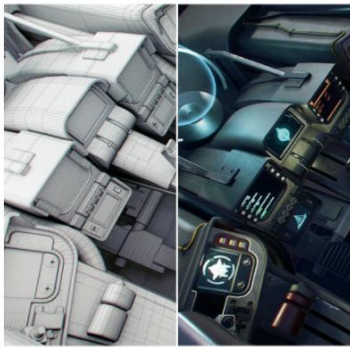




#### SPEED IT UP

Creating video game environments can be hugely time consuming but there are ways to speed up your pipeline





### 3 GAME EXAMPLES

Tiling textures as a base with the use of extra bevels and polygons, together with custom normals to add highlights, has been used in several games but with different methods. Spend your polygon budget creating a nice smooth silhouette; don't go crazy with geo on unnecessary places. Just because it's next-gen doesn't mean modelling each bolt on a crate you're adding to the vehicle. Add more crates with the same quality you would've previously.

### 4 CREATE TEXTURE SHEETS

People always think that tileable textures have to be super high-res. That's not true; you can get away with a 512 texture as long as you tile it enough. You can even make a texture sheet with a lot of separate tileable elements (such as with architectural materials). So you can texture a room with three textures: one for the rims and trims, one for the floor and one for the decals.

HARD  
SURFACE  
MODELLING

### IN-GAME MODELLING THE ORDER 1886



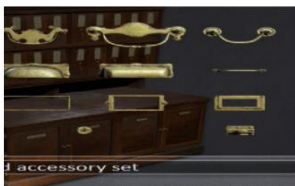
#### ONE BASE MODEL AND TEXTURES

This is an example of an in-game model without normal maps with tileable textures, to get a nice clean base.



#### TWO DUST AND GRUNGE

Adding a more realistic look to the model. You can do the same with your props, by vertex painting or adding decals.



#### THREE ADDING BAKED GEO

Once the base is created, add baked props to the tileable textured prop, so you can break up patterns and make it feel more unique.



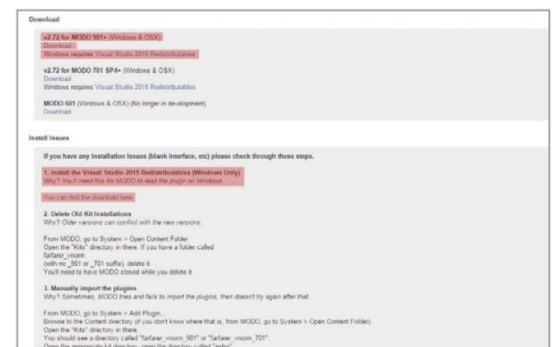
### 5 STAMPING TILEABLE TEXTURES

The downside with tileable textures is that they can become boring and uninteresting. You can solve this problem by making a stamp and adding decals over the models. There's also megatextures, which is like painting on geometry after the environment artists are done building the scene. It's even more effective if you blend in the normal maps with each other so you have a nice contrast between them.



### 6 INTRODUCING SUPER UVS

Super UV Tools in Modos is very useful, so let's go over the main features. Load + Apply Materials means you can assign textures to the selected polygons. Rotation (ROT) let's your texture rotate your unwrap 90 degrees. Move enables you to move your unwrap isles to different distances, from 1-4, 16-64 and 256 pixels (this is handy when you want to exclude pieces while baking your normal map; no overlapping but still sharing the same information).



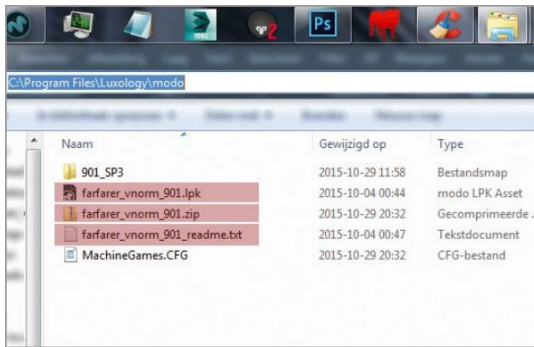
### 7 ADDITIONAL UV TOOLS

World Space UVs is a technique for mapping textures in world-space and is super useful as you can use the shader on a terrain, or any other procedurally created mesh, and the textures will map without requiring explicit UV coordinates provided by the mesh itself. You can choose for which planar unwrap you go for by clicking on the different icons. Finally, World Space Size found in the right corner, enables you to choose the texture size.

### 8 PREPARE AND DOWNLOAD

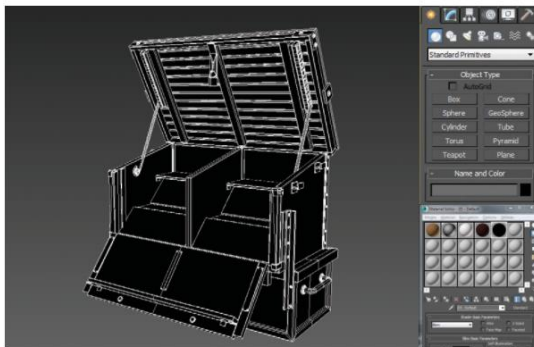
So how do you install this awesome plug-in? First of all you should make sure you have the latest update of Visual Studio 2015 Redistributables (you can find it here [www.bit.ly/206-details](http://www.bit.ly/206-details)). In Modos, go to System>Open Content Folder and open the Kits directory. If you have a folder called farfarer\_vnorm with no \_901 or \_701 suffix, delete it – and make sure you closed Modos while doing this.





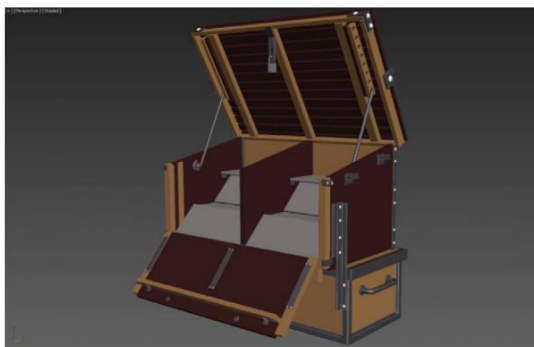
## 9 INSTALLING THE SCRIPT

With everything cleaned up, you can install the plug-in. You can download the script here [www.farfarer.com/temp/farfarer\\_vnorm\\_901.zip](http://www.farfarer.com/temp/farfarer_vnorm_901.zip) (for Modo 901). Once downloaded it you can get it working in two different ways: either drop the farfarer\_vnorm\_901.lpk into modo, or drop the farfarer\_vnorm\_901.lpk and the zip into the directory folder (but this can get complicated so I always go with option one). Once done you should see the icon in the icon bar.



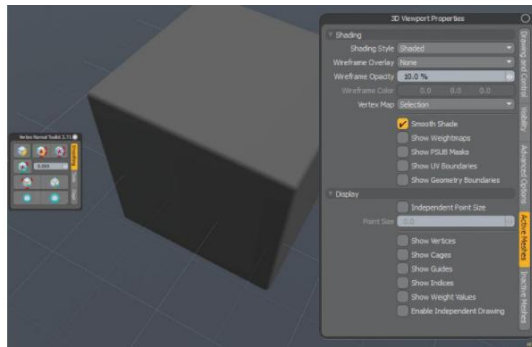
## 11 USING THE SCRIPT

Using the script is very easy as it bases smoothing on the edge and control edges, so as long as you have nice bevels it will smoothen them out. So basically, using this makes creating low-poly assets easier, as you don't have to bake out your normal maps. If you want, you can base the smoothing on the UV borders. You can even make selections based on the hardness of the polygons, so you can tweak your model on the fly.



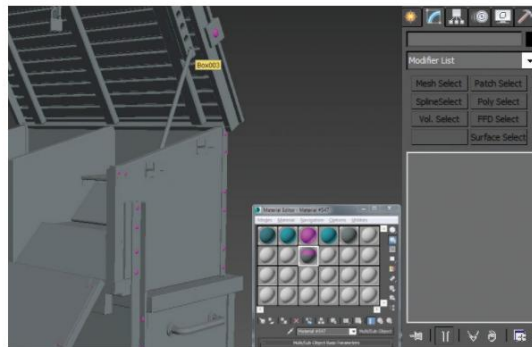
## 13 ADDING COLOUR TO PROPS

Adding colour patterns to your model can really help you understand how the model will look with tileable textures. This makes it easier to share your ideas with the team, so there is no misunderstanding when designing the props. For example, always use brown colours for wood and then detail some more, with dark brown for rough wood and light brown for furnished wood. It's about making it easier for yourself when you return to your project.



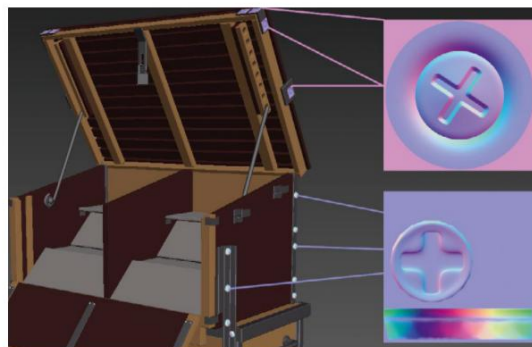
## 10 CHANGE MODO SETTINGS

Now that you have the logo showing, press [O] to bring up the 3D Viewport properties, then go to the Active Meshes, and turn on Smooth Shade. If you don't do this, you will never see the shading on the model update itself. Now go to the Vertex Normal Toolkit and make sure the Standard Value is set on 0.005. If you want to bring up more settings press the bottom right icon.



## 12 MAKING PROPS

The first step is the obvious one: you start by making your prop. You add as many control edges/bevels to your model to make it look nice. I end by making proxy spheres and add them to my models, which represent where I will add my bolts later. This way, I can still check if the model doesn't become too noisy. Note that this is still an optimised model.



## 14 ADDING DETAIL TO PROPS

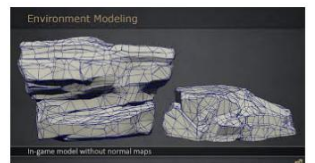
Now we have the base done we should add detail to it. I start by replacing the proxy bolts with baked assets. I always bake these out, add them to the model and immediately apply the normal map/.obj map – this way it's easier to see what is going on. This stage is all about making small detail objects, like handles, keyholes, small wheels for underneath the closet and so forth – then kitbash them later.

## EXPERT TIP

**Think in first and third-person**  
It's important when you make your environment to consider the player's view. Third-person environments need less detail in the texture compared with first-person levels. For example, bolts can be dots instead of fully created shapes when built for a third-person game.

## ORGANIC MODELLING

## IN-GAME MODELLING FROM THE ORDER 1886



## ONE ADD MORE BEVELS

As you see from the screenshot, the models need more chamfers when you don't use normal maps. The advantage of this is you will end up with high-quality models without a needlessly high polycount. Reduce one-off baked assets to a minimum.



## TWO ILLUSION IS HARD TO SPOT

Notice how the tileable factor of the texture is hard to spot in this screenshot, and the tileable normal map isn't too noisy.



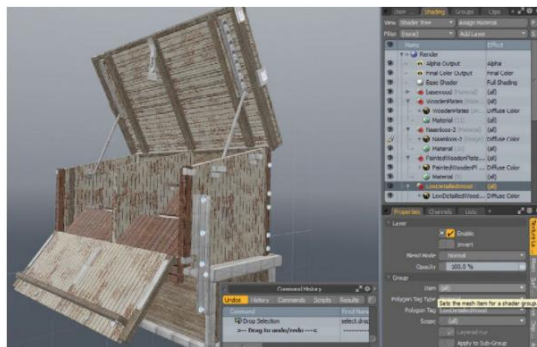
## THREE CREATE A GOOD BASE

When the base is done it's all about making it unique by adding decals/stamps and vertex paint info. Doing this means creating assets becomes really easy and fast. It's the same for making iterations of the same model.

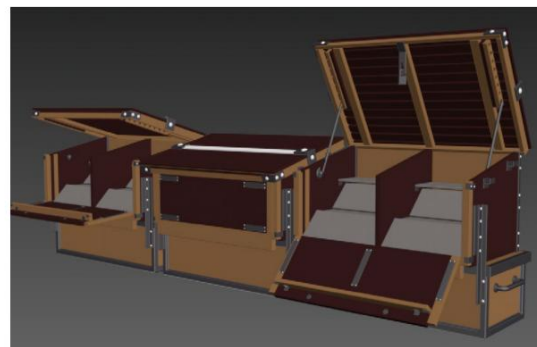


**EXPERT TIP****Make a library**

Bake small pieces separately, for example every bolt, decal, button, and handle gets its own texture. Export these all to the same folder. Later if you make other props you can kitbash all these elements.

**15 MAKING PROPS, PART 4**

Now let's move into Modo for modelling. I load my Super UV Tool (map a shortcut for this to [Shift]+[Ctrl]+[U] for speed) and Auto Unwrap the model with the Super UV Tool with by using the World Space UVs. I tweak my textures by rotating them. To finish I select the complete model and use the Vertex Normal Toolkit 2.71. This will automatically add weighted normals to my model. Download this model from [www.creativebloq.com/vault/3dw206](http://www.creativebloq.com/vault/3dw206) to try it out.

**16 ITERATE FROM ONE MODEL**

We can now make props really quickly but to speed it up even more, we can make different iterations from the same prop. Start by finding different silhouettes in the one object – you can play with compositions later on. Let's take the bookcase as an example. I make an open version, a closed version and one where the lid stands upright, so you get a different silhouette for each. Doing this means I can quickly create a market stall.

**17 START MAKING PROPLISTS**

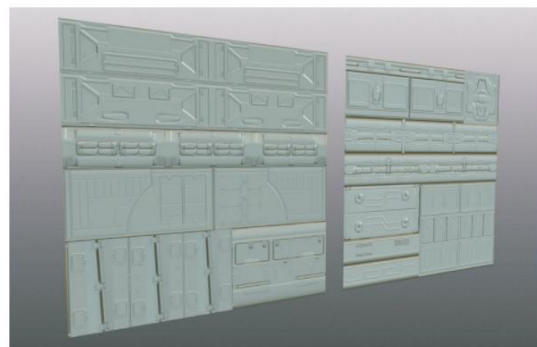
Making an environment can be a challenge, because you want to make it feel like a believable place. A good way of doing this is by having a broad range of props, for example create a list of variants on rubbish: a big dumpster, small garbage cans, empty bottles, broken crates and so forth. Another good idea is to make different versions of the same prop, such as three types of dumpster. This way you can play around with prop compositions in the scene.

**18 THINK ABOUT FUCTIONS**

When you make an environment, every corner of it needs to have purpose; the same goes for your props. Props that you place in the world should make sense. For example, if I add a set of old fashioned weighing scales to a room, I sit a stack of potato sacks nearby. It's all about telling stories with props, and that way you can reuse the same props over and over again in the same room for speed. And you can develop the idea by adding loose potatoes on the floor.

**EXPERT TIP****Texture density**

A good idea is to use the same density over all props, for example 1m = 512 pixels. This way you don't get blurry or noisy areas of your props.

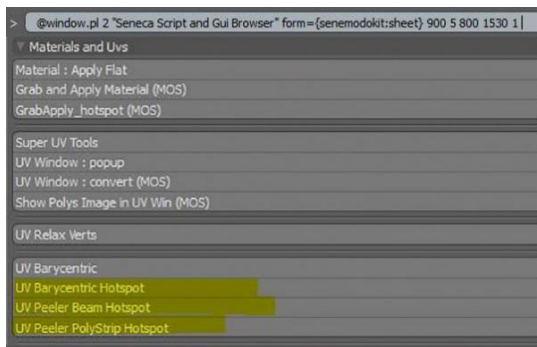
**19 ROTATE YOUR PROPS**

When propping out your environment you should try to play with silhouettes. Rotate props 45 or 90 degrees and turn them upside down. It's all about using the same props and trying different compositions with them. For example, flip over a storage rack; it looks interesting and now the player can climb up, or stack benches and sofa's on top of each other, to create a storage room feeling, or hang clothes to break the ceiling pattern apart.

**20 HOTSPOT INTRODUCTION**

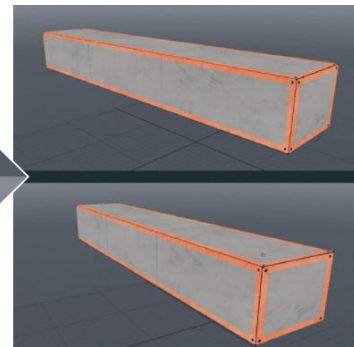
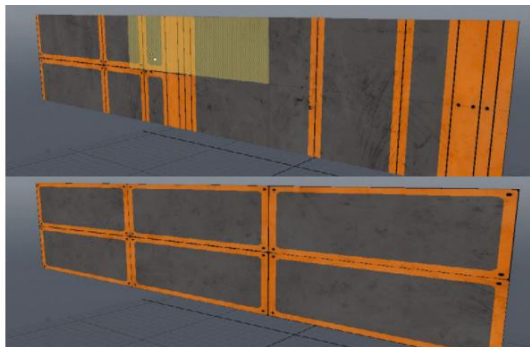
Hotspot texturing is something unique to Modo. Seneca's HotSpot script assigns textures from your texture sheet to your polygon, so you have to make a texture sheet with a lot of trims/tileable textures. The length of these should vary a lot, as the more variation you give them, the easier it is for the script to assign polygons with a texture that comes close to the right size. The goal of using this script is to speed up your workflow.





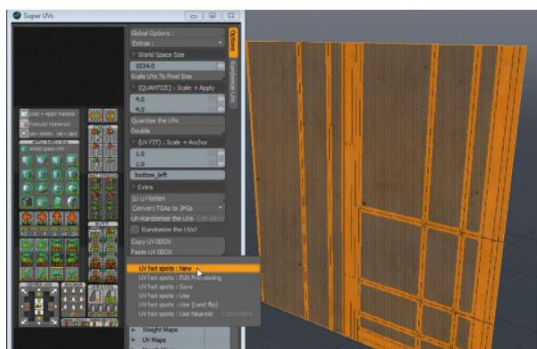
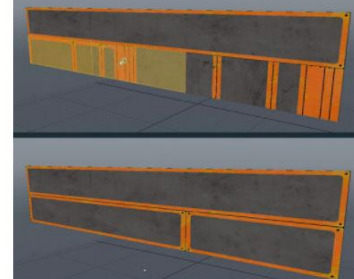
## 21 HOW TO USE HOTSPOT

The Seneca script only works for Modo and you can find it at [www.indigasm.com/modoscripts.htm](http://www.indigasm.com/modoscripts.htm). The site is full of super useful scripts but the one we are going to look into is Hotspot. The scripts are located under Seneca's mega list: @window.pl 2 "Seneca Script and Gui Browser" form={senemodokit:sheet} 900 5 800 1530 1. Copy and paste this into the command line in Modo and bind to something you like. The three you are looking for are discussed in step 22.



## 22 HOTSPOT METHODS

UV Barycentric Hotspot takes every selected face on the model and treats them as one single UV island and maps it to the closest matching area on your texture. UV Peeler Beam Hotspot, maps a four-sided closed beam as if you did it manually with PolyStrip on all sides (be careful, this can break the whole UV if used incorrectly). UV Peeler PolyStrip Hotspot takes your selected faces and treats the connected faces as one UV island and is perfect for trims or bent panels.



## 23 HOW TO SET UP A HOTSPOT

Setting up a Hotspot texture is not hard to do. The only thing you need is Modo and Seneca's Super UV tool. This one can also be found in Seneca scripts. To set it up, select the image you want to make to a Hotspot texture, right-click on the polygon and go for the shader and select the image name. Now go to the Super UV tool and press the UV Hotspots tab. Finally, go to the UV Hotspots tab and select New.



## 24 SPLIT AND CUT

The first thing you need is your texture sheet: make a square texture sheet with baked textures. The most important thing about this sheet is that there's a lot of variation in the size of the parts. Once this is baked down you can assign this texture to a square texture and cut in lines/edges so you can split it into nice UV pieces. Split all verts and clean up, so each island only has four verts. A good way to double check this is by adding a subdivision to your model.

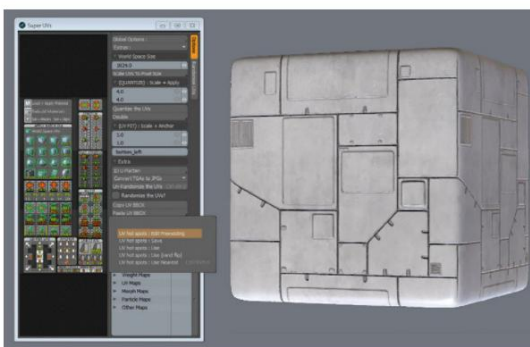
### EXPERT TIP

**Create a decal library**  
Make decals for your preset library. For example, if you have a pipe, add a plane behind it with some drainage and leakage on it. It's the logical look and that way you don't have to add decals later on.



## 25 SAVE YOUR HOTSPOT

So now you've created your Hotspot texture you need to save it and keep it as a preset. Go to the Super UV tool and press the UV Hotspots tab. Now select UV Hotspots: Save. Set how many pixels you want to crop with – normally 0. Choose if Resolution or Aspect is most important for the hotspot mapping and then it will bring up texture flippin. Just hit OK to finish and save.



## 26 EDIT HOTSPOTS

If you want to edit an already existing hotspot, you should select the image in your scene and press Edit Preexisting. Now go to the Super UV tool and press the UV Hotspots tab. Go to UV Hotspots>Edit preexisting. You will have to look on the backside of the plane and delete the duplicate that is created. Then press Save. Follow the steps under Save Hotspot and select Yes when it asks you to overwrite. ■

### CAPTION HEADER

Don't forget to check out Seneca's Modo script for other cool stuff [www.indigasm.com/modoscripts.htm](http://www.indigasm.com/modoscripts.htm)



**SECRET  
LABS.XYZ**

---

**COMING SOON**

**CHARLIE WEN  
TRAVIS BOURBEAU  
JOSH HERMAN  
DAVID FINCH  
HANNAH KANG  
JEAN-ERIC HENault**

**REGISTER TODAY**  
**AND BE PART OF OUR BETA INVITE FOR SOMETHING NEW**

**[www.secretlabs.xyz](http://www.secretlabs.xyz)**





CONTENTS

## OUR AWARDS



### BEST IN CLASS

Awarded to products that excel in their class.



### HIGHLY COMMENDED

Awarded to great products that achieve a high standard.



## GET PUBLISHED

EMAIL YOUR CG ART TO  
[ian.dean@futurenet.com](mailto:ian.dean@futurenet.com)



Visit the online Vault to download extra process art for these projects:  
[www.creativebloq.com/vault/3dw206](http://www.creativebloq.com/vault/3dw206)

# DEVELOP

Theory, research and reviews plus industry insight from today's experts



### 88 IS THE CG INDUSTRY CONVERGING?

Escape Studio's Simon Fenton explores the convergence of game and film processes



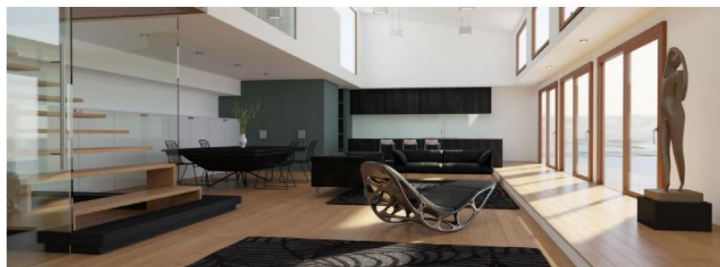
### 90 V-RAY FOR NUKE TIPS

Setting up lights in the compositing app



### 94 REVIEW: QUIXEL 2

Is this a must-have texture suite?



### 96 REVIEW: IRAY

Paul Hatton puts Nvidia's physically-based render plug-in to the test



### 100 MY INSPIRATION

Rebecca-Louise Leybourne on her career





# The convergence of game and film CG

*Simon Fenton* explains how the merging of tools in games and film is raising the bar for CG



## AUTHOR PROFILE

### *Simon Fenton*

Simon is a digital artist with 22 years' experience working in video games and computer graphics. He's worked at Sony Computer Entertainment Europe and Rare and joined the team at Escape Studios in 2008 where he is the head of games, leading the games art courses. [www.bit.ly/simon-fenton](http://www.bit.ly/simon-fenton)

As the video games and VFX industries advance, there are new technologies that point towards convergence of the two; VR perhaps being the most recent and exciting. Convergence has been a buzz word for many years. Indeed many of the same tools, such as Maya or ZBrush, are used in both fields, but it wasn't that long ago that a single plant in the film *Avatar* had more polygons than an entire game environment.

Now, in many instances, the production methods used in the creation of digital art for film and games are very similar. Motion capture, for example, has always been used in both industries but now just look at the work of *Imaginarium* on *Squadron 42*. I still get excited teaching PBR texturing to my students knowing

I am using implementations of the Disney GGX shader in the real-time engines.

Another area where there is a real convergence and crossover of talent is in the use of photogrammetry, which involves

In the past couple of years the process has now reached the kind of levels we're used to seeing in film production

taking photographic data of an object from many angles and converting it into stunningly realistic, fully-textured digital models.

Creating game assets from photographs isn't a new phenomenon but in the past couple

of years the process has now reached the kind of levels we're used to seeing in film production. From the incredibly realistic recreation of the Star Wars universe by DICE in *Battlefront* to Crytek's *Ryse: Son of Rome*, the bar of video game graphics is just getting higher and higher.

It might be hyperbolic to suggest the visuals of *Ryse* are in parallel with the classic film *Gladiator*, but it is never the less a stunning realisation of ancient Rome. The *Vanishing of Ethan Carter* has made fantastic use of photogrammetry, which is detailed by artist Andrzej Poznanski in *The Astronauts' blog*, as well as, of course, Epic Games' *Paragon* which makes use of photoshoots to capture HDR lighting on hair and skin (read more on this on page 36).



Game developer DICE proved just how high the standard of video graphics has become with their recreation of the Star Wars universe for *Battlefront*





Horror adventure video game *The Vanishing of Ethan Carter* made great use of photogrammetry

The use of photographic process to capture data has contributed to some of the most compelling looking graphics in games, and has played a huge part in driving games graphics forward.

## Capture the likeness

At Epic they used Agisoft PhotoScan to capture their images, but there are many issues native to the process of photogrammetry that need to be solved.

Dealing with reflections in photos of objects and/or poor lighting can be a real challenge, and can reduce the realism of the final output if they are not addressed. However, this is where the marriage of technology and artistry come together. In its fantastic blog *Imperfection for Perfection*, Epic outline its process, detailing the use of colour checkers and capturing lighting conditions using VFX standard grey/chrome balls. They detail how important it is to remove lighting information from your source images – something that Dice experienced when trying to capture Darth Vader's helmet.

It's interesting that VFX supervisor Kim Libreri, the CTO at Epic Games (who has worked on many movies and the cancelled video game, *Star Wars 1313*) predicted that games graphics

would be indistinguishable from reality in a decade.

## Real but not photo-real

Just because a rigorous scientific process has been used, doesn't mean that everything has to look 'photo-real.' For example, *A Boy and His Kite*, which uses amazing photorealistic, high-fidelity photogrammetry and attention to colour, has an almost painterly quality that Pixar would be proud of.

It goes without saying that a games artist needs to be able to model by hand, but it is also very important to use all technologies available to us and often this technical form of modelling still needs to use artistic decision making, such as retopologising, and applying stylistic treatment to textures and materials.

At Escape Studios we've used 123 Catch and students have had great success with it. For those who want to showcase their skills to potential employers, it's a benefit to include an example of this process in a portfolio, to show how they've created an asset in this way. Whilst being an artist in games and being an artist in VFX still require differing skillsets, the convergence of technologies means there's greater potential to work across both mediums.

For more on Escape visit the VFX Festival: [www.thevfxfestival.com](http://www.thevfxfestival.com)



Sign up for the VFX Festival

The VFX Festival, created by Escape Studios, part of Pearson College London, will run from 23-25 February 2016 at London's O2. It will bring the best in VFX, games, animation and motion graphics to industry professionals and anyone considering a career in visual effects. Find out more: [www.thevfxfestival.com](http://www.thevfxfestival.com)



## THE VANISHING OF ETHAN CARTER

In his blog, artist Andrzej Poznanski reveals what it takes to fake reality

Photogrammetry was used heavily in the video game *The Vanishing of Ethan Carter* because, according to Andrzej Poznanski, it's the best way to replicate reality... because you're using reality. However, the problem with video game textures is your brain can spot the difference, he argues. Gritty textures are placed too evenly, stains and dirt placed with too much care or found in places your subconscious knows they shouldn't be.

From rocks to waterfalls, bricks to entire buildings, the team on *The Vanishing of Ethan Carter* created detailed studies of these objects using PhotoScan by Agisoft, in Andrzej's words: "You feed it with good photos taken around some object and you get the exact replica of that object, in 3D, in full colour, with more detail than you could ever wish for."

Andrzej reveals how photogrammetry is a skill in itself that just being a good photographer won't help, "Most people know how to snap photos, but very few know this craft really well, and even for those few, a change of mindset is required. You see, most of things that photographers learn is the opposite of what photogrammetry requires."

Photogrammetry is one of those moments in CG art where industries converge, film VFX and video games – but there will be more to come. As real-time rendering becomes more powerful, and industries merge products, VR movies are coming and understanding these convergence points will help your career. Read more of Andrzej's insights on his blog: [www.theastronauts.com](http://www.theastronauts.com)





# Manipulating lights in V-Ray for Nuke

In his second tutorial, *Josh Parks* reveals how to set up lights in V-Ray for Nuke



## AUTHOR PROFILE

### Josh Parks

Josh is a compositor at MPC as well as a part-time lecturer at the University of Hertfordshire.

[www.joshparks.co.uk](http://www.joshparks.co.uk)

In my last article I covered the questions that I was initially faced with answering when starting out with V-Ray for Nuke. In this article I'm going to show you different ways of setting up lights within the V-Ray for Nuke plug-in, and a use for the values in the Position pass that we can get V-Ray to output.

As a compositor, I feel most comfortable working in the world of 2D, manipulating AOVs (Arbitrary Output Variables) to give me the desired look I want. Adjusting V-Ray nodes in Nuke's 3D space is fairly simple, but it's nice to have it feel as familiar

as possible. I spoke with Shahin Toosi, an experienced compositor working with Chaos Group, who cleverly uses the Position pass in order to sample an area to point your light at. This allows us compositors to use our 2D passes in order to affect our 3D scene. This is pretty smart, especially as it can be fiddly aiming your lights at the exact point you want. As well as this, it's always a good idea to have a better understanding of just what information we can get out of V-Ray render and how it can be used.

In this tutorial I'm going to cover how to set up your own



Chaos Group have got a range of tutorials on their YouTube channel covering Nuke.

You can view them at:  
[www.bit.ly/206-vraynuke](http://www.bit.ly/206-vraynuke)

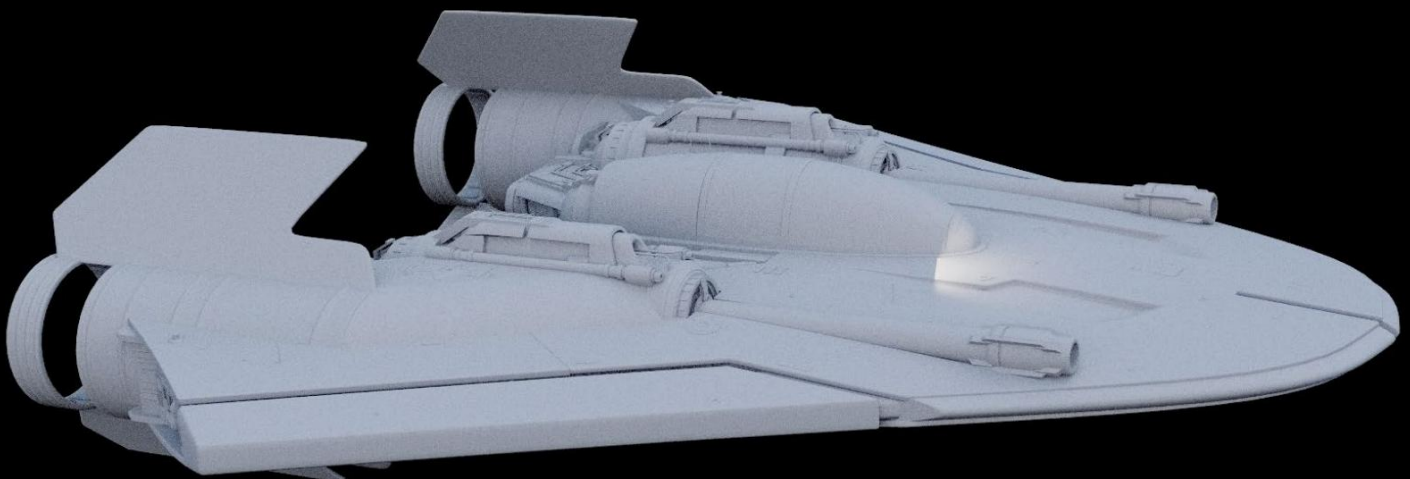
scene that will allow you to utilise the position AOV, using some clever maths and expressions between nodes. It will also give us a better understanding of how to use the position pass and exactly what the values mean.

You could use the following information for regular Nuke lights; it doesn't have to be set up with V-Ray. This will allow us to use our Position pass in order to point a light at a point that we sample.

Thanks go to Andrew Hodgson at ILM who let me play around with his spaceship model.

**FYI** For all the assets you need go to [creativebloq.com/vault/3dw206](http://creativebloq.com/vault/3dw206)

There are a variety of ways to set up lights within the V-Ray for Nuke plug-in

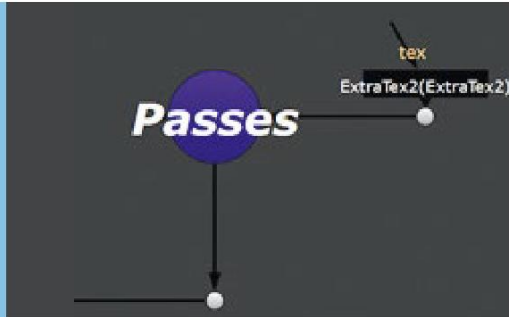




GET  
STARTED WITH  
LIGHTING

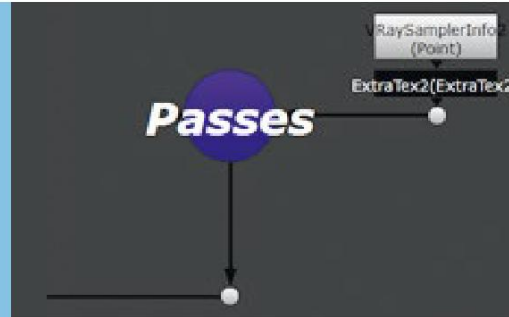
## PROCESS: SETTING UP LIGHTS

Josh Parks shows how to manipulate scene lights in V-Ray for Nuke



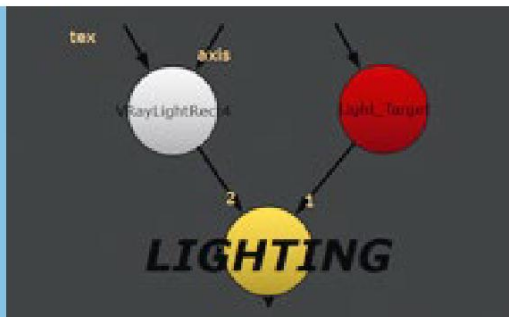
### ONE CREATE OUR PASSES

In order to get the information we need out of V-Ray renderer we need to bring in a V-RayRenderElement node, set it to ExtraTex in the RenderElement Properties panel and in the Channel Name panel enter its position. We then plug this into a Scene node named AOVs and the Scene node into a V-RayRender node, so we can render our scene.



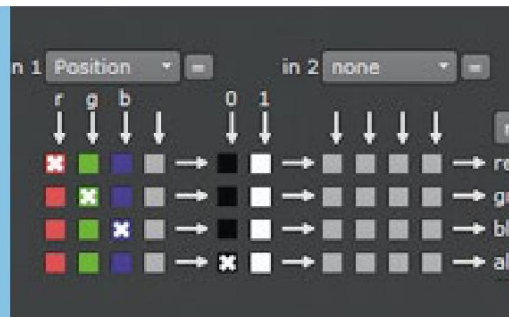
### TWO REMOVE DATA PASSES

Now that the V-RayRenderElement is set to ExtraTex we have access to the Tex input within the node. We need to plug in a V-RaySamplerInfo node into this input and set the Output to Point. This allows us to kick out various data passes that we can use later in our comp. Make sure you untick the Anti-Aliasing box within the V-RayRenderElement node.



### THREE CREATE AN AXIS AND A V-RAY LIGHT NODE

Bring in a V-RayLightRect and place it where you want it in the 3D scene. Our setup will rotate the light in this position, aiming it at a position we sample in our Position pass, rather than move the light. Now you need to create an Axis node, this will be the position that our light points at; label it Light\_Target. Make a note of what you call both the axis and light.



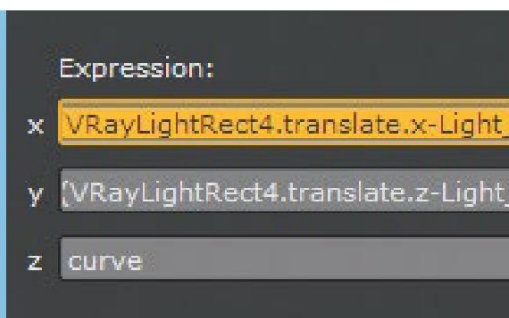
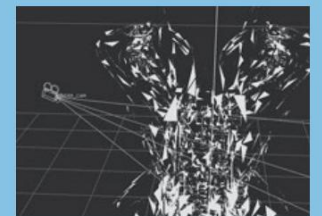
### FOUR SHUFFLE THE POSITION PASS INTO RGBA

Next we need to shuffle our Position pass information into the RGBA channels. In order to do this, create a Shuffle node underneath your V-RayRenderer and set the Input to Position and leave it shuffling the RGB information in our Position pass into the RGBA pass.

## SETTING A CAMERA AIM

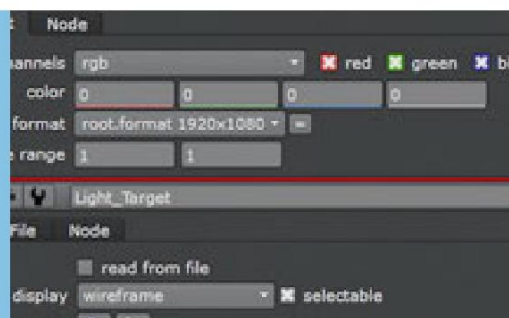
Point your camera at an object

You could use this same technique in order to get a camera to point at a specific point on our object. In order to do this you would need to just swap in your camera and axis name into the expression.



### FIVE ADD EXPRESSIONS TO YOUR CAMERA ROTATION

Add the expressions from the text file I've put on the online Vault for this tutorial, into your camera. Do this by bringing up your Light properties and go into the Axis panel. Right-click the Animation Panel and click Edit Expressions. Paste the expressions into the X, Y and Z panel. You'll need to replace the name of your camera and Axis node in the expression.



### SIX HOLD POSITION VALUES WITH A CONSTANT NODE

Next we need to create a Constant node that will hold our Position pass value. We'll then use an expression to add these values to our Axis node. Hit number 4 in the Constant Properties panel, and this will give us the values for each colour channel.

To add these values to our Axis node, bring up both the Constant and Axis node properties

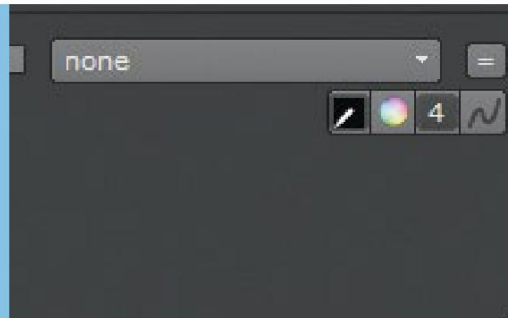
## FURTHER TRAINING

Explore lighting in Nuke

Chaos Group have a great tutorial on their YouTube channel which talks you through each light in the V-Ray Lights menu and how they can contribute to a scene. View it at [www.bit.ly/chaos-group](http://www.bit.ly/chaos-group)

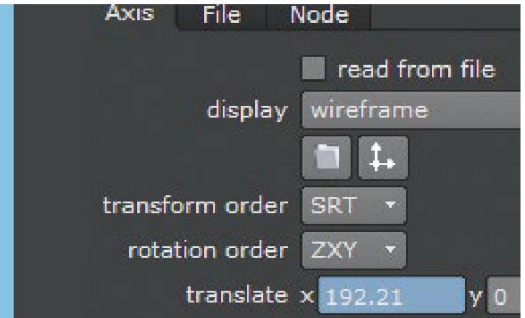


Having lower samples allows you to lookdev quicker within Nuke



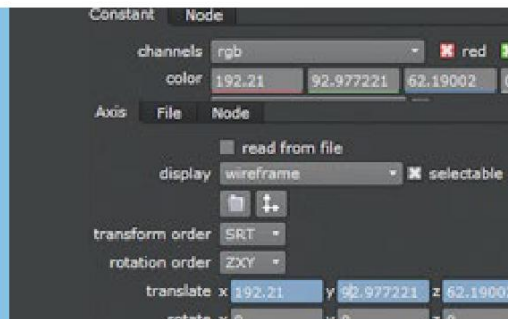
### SEVEN SAMPLE OUR POSITION VALUES

To sample our Position pass, view our Shuffle node and [Ctrl]-click the colour square – this allows us to sample values in our viewer. Now to add these values to our Axis node, bring up both the Constant and Axis node properties.



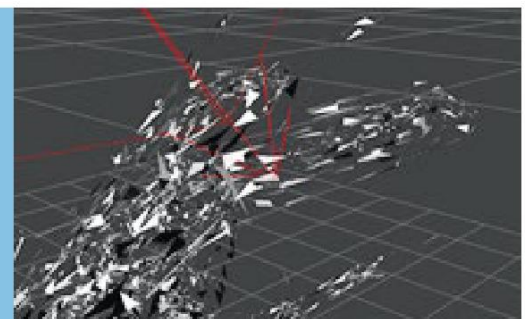
### EIGHT ADD AN EXPRESSION FROM CONSTANT TO AXIS

In a Position pass the red channel represents our X axis, green our Y axis and blue our Z axis. With this in mind, we need to add our sample information from our Constant node to our axis. [Ctrl]-drag these value sets up an expression between these knobs, so that these values will update with whatever the value is in the Constant node. This allows us to dynamically move our Axis node.



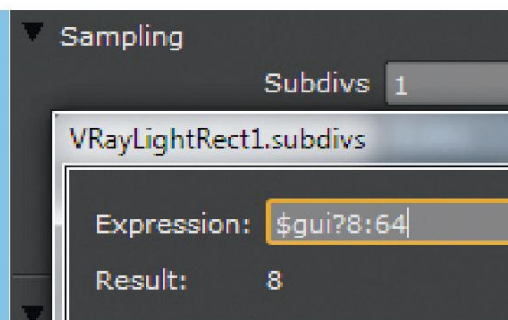
### NINE ADD AN EXPRESSION (PART 2)

Now with both the Axis node and Constant node properties open, [Ctrl]-click and drag the value from the red channel into the translate X of our axis. Do the same with the green channel into the Y axis and blue into the Z axis.



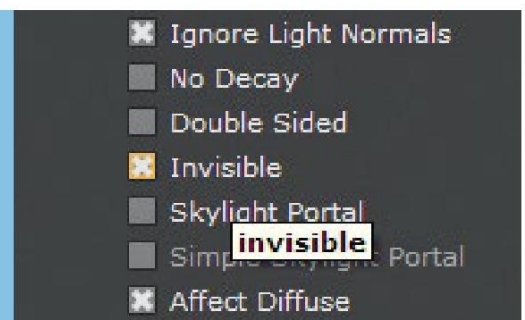
### TEN TEST OUR SETUP

To test our setup I create two viewer nodes: one viewing our 3D scene and the other viewing our Shuffle node that's shuffling the position pass into our RGB channels. Open the Constant Properties panel and start sampling different areas of our position pass to check your light dynamically moves to the point you just sampled. If not, check your Axis node is moving, then check the expressions in your light.



### ELEVEN CHANGE THE KNOB VALUES

If you have a render farm or render out of Nuke without the GUI open, add an expression to change the values of a knob depending whether GUI is open. You can lookdev quicker within Nuke with lower samples, then render out with higher samples. Right click the sample properties and enter the expression: \$gui?8:64. If the GUI is open your sample value will be 8, and 64 when closed.



### TWELVE CHANGE THE LIGHT SIZE

So once you're happy with the direction of the light, you might want to go in and change some of its properties. Changing the U and V size will alter how big your light is, for example. Another useful tip is to tick the Invisible button so your light doesn't show up during rendering.



**FREE!**  
VIDEOS  
MODELS  
& FILES

**3D**  
WORLD

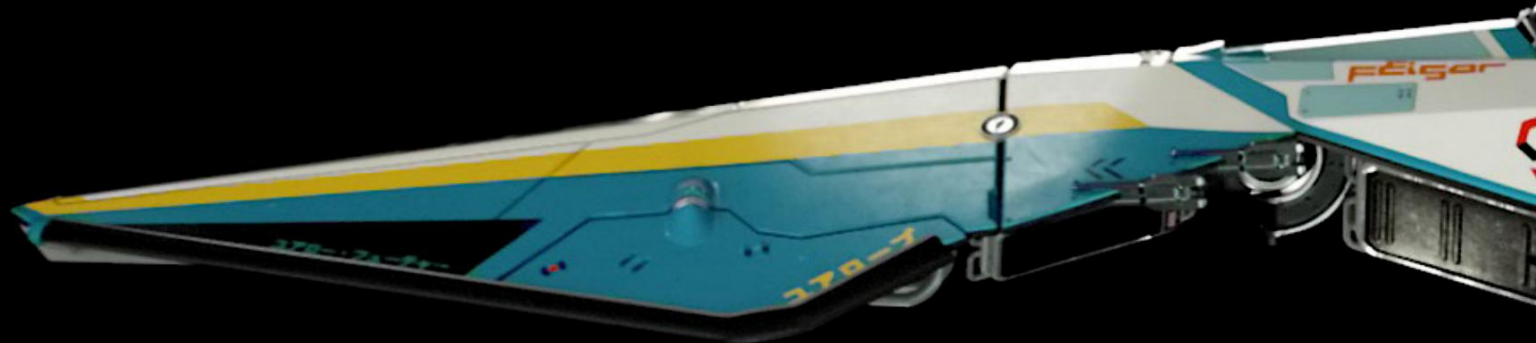
ISSUE 207

# NEXT MONTH

Keeping it photoreal! Master the latest techniques  
to create lifelike renders and CG art!

**ISSUE 207, ON SALE 23 MARCH**

PLUS: HOW TO DESTROY BUILDINGS IN REALFLOW! SUBSCRIBE TODAY: [www.bit.ly/3dworld-subs](http://www.bit.ly/3dworld-subs)



SOFTWARE REVIEW

# Quixel Suite 2

PRICE \$99 (indie) or \$409 (commercial) | COMPANY Quixel | WEBSITE [www.quixel.se](http://www.quixel.se)



## AUTHOR PROFILE

### Paul Hatton

Paul leads a studio in England specialising in creating beautiful and interactive videos and environments. He has been working in the industry for over a decade.  
[www.cadesignservices.co.uk](http://www.cadesignservices.co.uk)

The groundbreaking PBR texturing software from Quixel has reached its second iteration. Its suite of tools (NDO, DDO and 3DO) provide everything you need to move a 3D model through the texturing, lighting and rendering phases.

Quixel has made every attempt to make the adoption of this suite of tools as straightforward as

used to different ways of painting. All other features like moving, scaling and adjusting textures/selections are also the same as in the standard Photoshop interface. Choosing to utilise these tools was a clever step by Quixel as it enables artists to adopt the software more easily and quickly.

If you're already familiar with Quixel then you'll find that this

According to the documentation, "It essentially allows you to assign the currently selected layer or group to a Colour ID by holding [C] while clicking the Colour ID you want it assigned to." This is a massive time-saver.

## Material considerations

In the previous version Quixel introduced a library of over 1,000 scans of real-world materials. These continue to be integral to the new suite of tools, and despite not being new to this release, this is worth mentioning here for anyone still undecided about buying this software. With this type of workflow you need materials that react physically and predictably, and that's exactly what Quixel gives you.

To deliver speed improvements in this version, Quixel has also introduced a 'Flatten' feature, which despite its name is completely non-destructive. It essentially collects or zips up all currently present layers into a

This new version greatly streamlines the process of setting up a project with DDO, and the completely non-destructive Flatten feature boosts performance

possible. Despite the confusingly named tools (confusing to me at least!) it has succeeded in creating an easy to navigate website, and 3D artist Wiktor Öhman has created a gorgeous set of workflow tutorials that make viewers want to delve into the software.

Once inside of Quixel (inside of Photoshop) we find a suite of tools that integrate seamlessly into Photoshop. A great example of this is that many of the Photoshop tools such as the brushes, lines and shapes can be used to add details to your normal maps. This means that you don't have to get

version has greatly streamlined the process of setting up a project with DDO. The Base Creator is vastly more logical and straightforward than previously, making it quicker and easier to get to the important part of texturing your models. To aid the texturing workflow, Quixel has introduced a new feature that is accessible with 'C-Click Assign'.

## A BRILLIANT SECOND ITERATION

Quixel has produced an incredible piece of software. This suite of tools (NDO, DDO and 3DO) work seamlessly inside Photoshop, giving you easy-to-use tools that enable you to not only texture your objects but also add extra detail to them with customisable normal maps.





#### MAIN FEATURES

Normal Painting

Multi-Normal Layers

Pre-loaded Material Library

Rendering

Final Render Editing

single folder. Thankfully this isn't just a nice feature to neaten up your project, it actually gives you improved performance and will free up much-needed memory. It is important to note, though, that the performance you achieve will obviously be dependent on the spec of your computer.

### Faster and finer

At a modest \$99 (indie) or \$409 (commercial), this suite of tools is an absolute no-brainer. The amount of time alone that you will save texturing models will make the initial cost outlay well worth it. And that's not to mention the improvement in quality you'll find adopting this workflow.

All in all this is an excellent release of a piece of software that I can only see making increasing inroads into the gaming and visualisation markets, some of which it's already achieved. If you just want to have a play around and test its capabilities then you can make use of its 30-day trial. An impressive amount of work has been put into the development of this suite of tools and I think you'll find it invaluable should you choose to embrace it.

VERDICT



Quixel's DDO supports a range of inputs including mesh, Material ID, normal, and varied types of prebake

### IN PRACTICE: REVOLUTIONISING THE TEXTURE CREATION PROCESS

You can forget laborious texture creating inside your favourite modelling software. Quixel can achieve incredible results in a matter of minutes compared to hours with a more traditional approach. It'll take some getting used to, but it's well worth the time invested in the learning curve.

## SOFTWARE REVIEW

## Iray

PRICE \$295 | COMPANY Nvidia | WEBSITE [www.nvidia.co.uk](http://www.nvidia.co.uk)

## AUTHOR PROFILE

**Paul Hatton**

Paul leads a studio in England specialising in creating beautiful and interactive videos and environments. He has been working in the industry for over a decade.

[www.cadesignservices.co.uk](http://www.cadesignservices.co.uk)

Iray is owned by Nvidia, the same company that own mental ray. What sets Iray apart from mental ray though is its ability to deliver immediate results within a range of different disciplines including architecture, engineering and advertising.

Before we dive straight in let me just give some background to Iray. So far it has been shipped with 3ds Max, in the same way that mental ray is. The problem for Nvidia though is that Autodesk have the ultimate say in what the final Iray product is like. Nvidia have decided to break their Iray rendering software out of 3ds Max and offer a plug-in based solution instead. This also means that they can release more regular updates. Other versions for Revit and Cinema 4D are in development.

There are two areas that Nvidia believe will set them apart in this market: surrounding the creation of materials, and the utilisation of non-local resources for rendering. So let's now take each one in turn.

Firstly, Iray now supports the Material Definition Language which gives users the ability to share their physically based materials and lights between supporting applications. This means that materials are no longer restricted to Iray in 3ds Max, for example, but can now be utilised in another application that supports MDL. This is a great feature for people who use different applications at different stages of a project.

**Iray server**

The other benefit of this MDL is that Nvidia are using it to provide Iray users with over 300 different materials. They are text definitions of materials based on physically correct properties. This means that users can rely wholeheartedly on these materials for correct representation in their renders, without the requirement for any complex setups. Nvidia say that this opens Iray up to a whole range of users – and particularly novice users.

The downside to this is that Nvidia seem only keen to cater to artists that want physical accuracy. This unfortunately isolates artists who are keen to create art that is not necessarily limited by physical properties.

Secondly, Iray is making a big thing of being able to utilise the CPUs and GPUs that are not local. They're calling it Iray server. This

Nvidia have decided to break their Iray rendering software out of 3ds Max and offer a plug-in based solution instead

could be resources contained on a network in your location, or even something like a Visual Computing Appliance (VCA) which contains eight high-end Nvidia GPUs. There are 12GB of memory per GPU and a stack of CUDA Cores. If you have access to other CPUs/GPUs, or the luxury of a VCA then Iray will really start to come into its own. With that backing, an Active

Iray is set apart by its ability to deliver immediate results within a range of disciplines, including architecture and advertising

## MAIN FEATURES

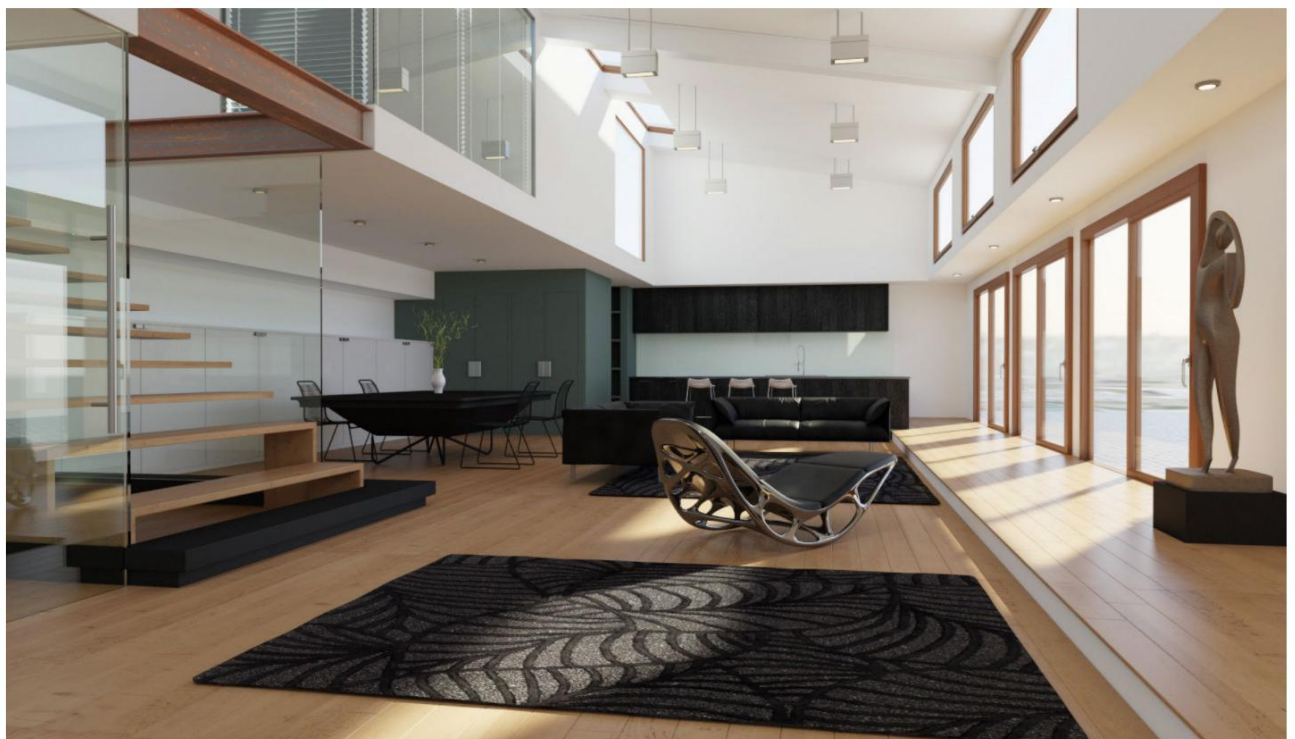
Physically based rendering

Material Definition Language

Physically correct lighting

Global Illumination

Server side rendering





## THE GRAPHICS CARD POWERHOUSES

Nvidia is huge; as a company it's been going since 1993 and has built up an impressive client base. In the rendering market they are more well known for their mental ray renderer but also have Iray in their rendering plug-in arsenal. These tools, teamed up with their latest graphics cards, can deliver results at incredible speeds.



Shade window can become like a viewport, enabling you to interact with objects, materials and lights while getting no lag whatsoever.

This all sounds rather promising. Well, it depends. The more money you throw at your computer, the better the rendering engine is going to be, no matter what engine you are using. If you have the luxury of spending thousands of pounds on a Quadro 6000 then naturally you're going to get quick feedback. Unfortunately, I don't know how many users are going to pack this sort of equipment. Especially considering that Nvidia are wanting to draw in visualisation 'novices' like architects and designers. Are these people really going to be focusing on purchasing high-end graphics cards?

Iray users will be provided with over 300 different materials which they can rely on for correct representation in their renders

That being said, if you have the money then Iray will deliver. They advertise that a Quadro M4000 is 3.5 times faster than a Xeon E5-2697 (32GB RAM). And a Quadro M6000 is over six times faster. For those able to get a VCA, you'll be looking at nearly 40 times faster!

One massive plus about the Iray server is that there is a web interface to give you maximum control on the go. Once you've submitted a job to the server, you can leave 3ds Max behind. You can even send a render to the server at a low resolution, check the output using the web interface, and if you like it, you can re-render at a higher resolution, right from inside the web interface. This is a nice feature.

So hopefully that gives you a good overview of how Iray are trying to set themselves apart and thereby give you a good indication as to whether it's worth investing in. I would say that if you only care about physically accurate results, and especially if you're a novice visualiser, then Iray is a perfect solution for you. You'll be able to create correct looking images of your designs and schemes without having to worry about loads of complicated render and material settings.

## VERDICT



## IN PRACTICE: USING IRAY SERVER

Iray server is broken down into two distinct modes; Streaming and Queue. What you're trying to achieve will determine which mode you need to use. Let's take streaming first. This enables you to utilise the CPU and GPU resources on a single remote node and see the rendered results on your local machine. This is unfortunately restricted to a single node, meaning that clustering nodes is not possible. However, you could utilise a single node containing multiple graphics cards. This is aimed squarely at the design process and for getting immediate results back while amends are being made.

It's great to be able to see the render in the web interface but it would also be great to see it in 3ds Max too

The second option is Queue, which enables you connect to, and cluster, a multitude of nodes. This is designed for final renders. The scene is sent to the server with the render completion requirements. This will be the number of desired iterations that you want the rendering to go through. There is no rendered output in 3ds Max for this, which is a shame, but it can be seen in the web interface. This is sort of bittersweet; it's great to be able to see the render in the web interface but it would also be great to see it in 3ds Max too.

Finally, it's important to note that if you want any of your nodes to work as server nodes then those nodes must have active Iray server licenses. This is the same price as the core plug-in. One major let down here is that you can't utilise resources on a machine that only has the core plug-in. This means that if you have a studio of 10 people, all with the Iray plug-in installed, you would need to fork out extra licenses for Iray server to enable you to access the resources of those machines.





**CATCH  
UP TODAY!**

Visit Google Play,  
Apple Newsstand  
and Zinio stores  
to download a 3D  
World back issue to  
your tablet or  
computer.



## Back issues

Missing an issue of 3D World?

Fill the gaps in your collection today!

**Issue 205** March 2016  
**Master mech modelling**

- Improve your modelling skills and create a tank-inspired mech
- Rise of the Robots: experts share their techniques for mechanical projects
- Get started in texture app Quixel Suite 2
- Learn how to sculpt a Norman Rockwell character with ZBrush
- **Downloads** Free models, videos, material textures, project files & more!



**Issue 204** February 2016  
**Star Wars: The Force Awakens**

- Behind the scenes: ILM discuss the making of The Force Awakens
- Master the workflow for modelling ZBrush droids
- Create a photoreal character render of Boba Fett
- Discover the untold story behind the making of A New Hope
- **Downloads** Free models, videos, material textures and setup files!



**Issue 203** January 2016  
**The 2016 VR revolution**

- Improve your real time CG: The game artist's guide to VR
- Discover Epic's 10 ways to improve your Unreal Engine VR movies
- Render a photoreal VR scene from V-Ray to Samsung headsets
- Master high-poly creature design
- **Downloads** Free software worth \$199, models, videos, setup files!



**Issue 202** Christmas 2015  
**Anatomy sculpting**

- 10 techniques to perfect Anatomy. Plus get this cover's ZBrush model!
- Weta creature modelling masterclass
- Model the Joker: create dynamic ZBrush illustrations
- Hone your post-production skills for perfect lighting
- **Downloads** Free Creative Market models, video training, setup files!



**Issue 201** December 2015  
**Game art techniques**

- Art of Halo 5 Guardians
- Master character design with Insomniac Games' pro advice
- Create and texture a robotic character with Substance Designer
- Concept and design a real-time game character
- **Downloads** Free iClone 5, video training, setup files, ZBrush models and more!

**Google Play** [www.bit.ly/tdw\\_google](http://www.bit.ly/tdw_google)





**Issue 200** November 2015  
The 200 greatest VFX films

- ▶ Sculpt a T-800 Arnie in ZBrush
- ▶ Model a cinematic alien creature in ZBrush and 3ds Max
- ▶ Create organic armour in Maya
- ▶ Discover the 200 greatest VFX films in our reader poll
- ▶ How to make a printable costume
- ▶ **Downloads** Free Maya eBook, Digital-Tutors courses, models and more!



**Issue 199** October 2015  
The rise of TV VFX

- ▶ Create our cover figure: Artifex Studios explain their process
- ▶ Master matte painting to recreate a Star Wars Episode VII scene
- ▶ The rise of TV VFX: Discover how TV's VFX shows are created
- ▶ Recreate an epic Game of Thrones battle scene in 3ds Max
- ▶ **Downloads** Video tutorials, textures, models and setup files!



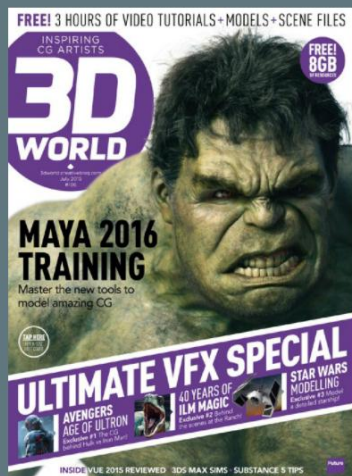
**Issue 198** September 2015  
ZBrush robots

- ▶ Master hard surface modelling in ZBrush
- ▶ 25 essential Cinema 4D techniques
- ▶ The VFX of Jurassic World
- ▶ How to model 3D print-ready collectable figurines
- ▶ Graphics card review group test
- ▶ **Downloads** ZBrush model, video tutorials, Substances and more!



**Issue 197** August 2015  
Video games art special

- ▶ Professional games artists share their work and insights
- ▶ Model a mecha character for video games
- ▶ Create perfect run animation cycles for games
- ▶ Master Unreal Engine 4, includes video tutorial, models and textures
- ▶ **Downloads** iClone 5 worth £69, video tutorials and project files



**Issue 196** July 2015  
VFX special

- ▶ 40 years of ILM, plus discover the VFX of Avengers: Age of Ultron
- ▶ Model Star Wars inspired spaceships
- ▶ Master the new modelling tools of Maya 2016
- ▶ Create an epic sci-fi environment in Modo
- ▶ **Downloads** Video tutorials, project files, resources and more!



**Issue 195** June 2015  
Photoreal portraits

- ▶ Create a lifelike portrait with effective modelling & rendering
- ▶ Sculpt armour in ZBrush
- ▶ Meet Chappie: how Image Engine brought the robot to life
- ▶ Industry experts advice for kickstarting your career in CG
- ▶ **Downloads** Free book, video tutorials, project files, resources and more!



**Issue 194** May 2015  
Make a Star Wars movie

- ▶ Create your own VFX movie
- ▶ Master mech modelling in Cinema 4D and ZBrush
- ▶ Star Trek interview: Pierre Drolet talks building starships
- ▶ The ultimate guide to lighting and rendering a complex illustration in LightWave
- ▶ **Downloads** Video tutorials, project files, resources and more



**Issue 193** April 2015  
ZBrush anime skills

- ▶ Master the art of modelling an anime style character
- ▶ ZBrush 4R7: why the latest release is an essential upgrade
- ▶ Create a collectible action figure
- ▶ 10 years of CG in anime: meet the directors who are creating the leading 3DCG
- ▶ **Downloads** Video tutorials, project files, resources and more





# Rebecca-Louise Leybourne

The Imaginarium's facial technical artist explains how a perfect smile shaped her career path



## ARTIST PROFILE Rebecca-Louise Leybourne

Rebecca-Louise is a facial technical artist at The Imaginarium Studios who's worked on Godzilla and Avengers: Age of Ultron. She blogs @ThatMocapGirl [www.bit.ly/mocap-girl](http://www.bit.ly/mocap-girl)

Being inspired is the best part of being a creative person, and while the littlest of things can inspire the biggest of ideas, I always feel lucky that I grew up with so much on offer to help me decide what I wanted to do for a living.

Through the 90s I had a front row seat of being able to watch as film and animation progressed into the digital age – from the beginning of Pixar, to my favourite books becoming huge franchises.

I can still remember in 2009 when I was at university studying animation and visual effects and trying to figure out what part of the industry I could see myself

in. When I went to see Avatar – which was the VFX filled film of the year – I came out spellbound. All I could think about afterwards was how much I wanted to know how they managed to get Sigourney Weaver's smile so right.

Performance capture and facial animation in particular has fascinated me and been my drive since then. It took a lot of hard work but also a little bit of good old fashioned right place, right time luck to get my first job in the industry.

I've spent the past few years tracking and learning pipelines from start to finish, which I think

Performance capture and facial animation in particular has fascinated me and been my drive

is important, but now being a part of the newest wave of technology breakthroughs that is enabling new ways of being able to achieve that perfect smile, inspires me everyday. Although sometimes I still go back and watch the behind the scenes of Avatar to get that fix if I feel I need it.

See more of Rebecca-Louise's work at [imaginariumuk.com](http://imaginariumuk.com)

Rebecca-Louise was left spellbound by the VFX in Avatar and how they captured Sigourney Weaver's smile so perfectly



IMAGE BY IVAN DE FRIAS

# Pulldownit 3.7

## destruction plugin

*Pulldownit plugin for 3ds Max and Maya is an advanced dynamics & fracture tool allowing to demolish buildings and bridges or cracking surfaces seamlessly.*

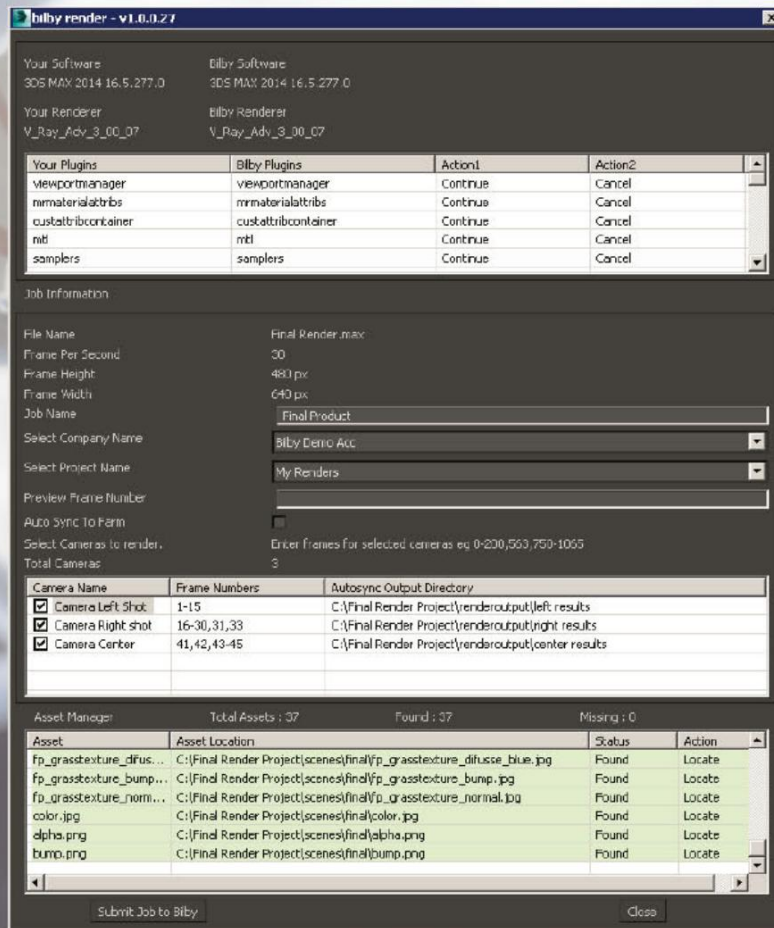
[www.pulldownit.com](http://www.pulldownit.com)





# Upload Once - Render ALL Your Cameras

Enter frame ranges for each of the cameras you want to render, then just upload the scene once.



# Render Farm + Collaboration

Do more with your render results using our free collaboration tools.

Teams - Clients - Reviews - Surveys - Planner - Calendar - Projects - Tasks - Full Featured FREE Account Available.

## Render Now

- ✓ 8052 GHz - 3552 Intel Xeon Cores.
- ✓ Plus FREE Hyper Threads to Double that Rendering Power.
- ✓ Fully AUTOMATED Render Farm.
- ✓ Seamlessly INTEGRATED into your 3D Pipeline.
- ✓ FREE to use Collaboration Tools.
- ✓ READY TO RENDER NOW.

# FREE \$50 RENDERING TRIAL

V-Ray | 3DS Max | Maya | Cinema 4D | Blender | bilby.com